ILLINOIS

December, 1946

In This Issue

The Management Of Acute Craniocerebral Trauma

✦

and Others

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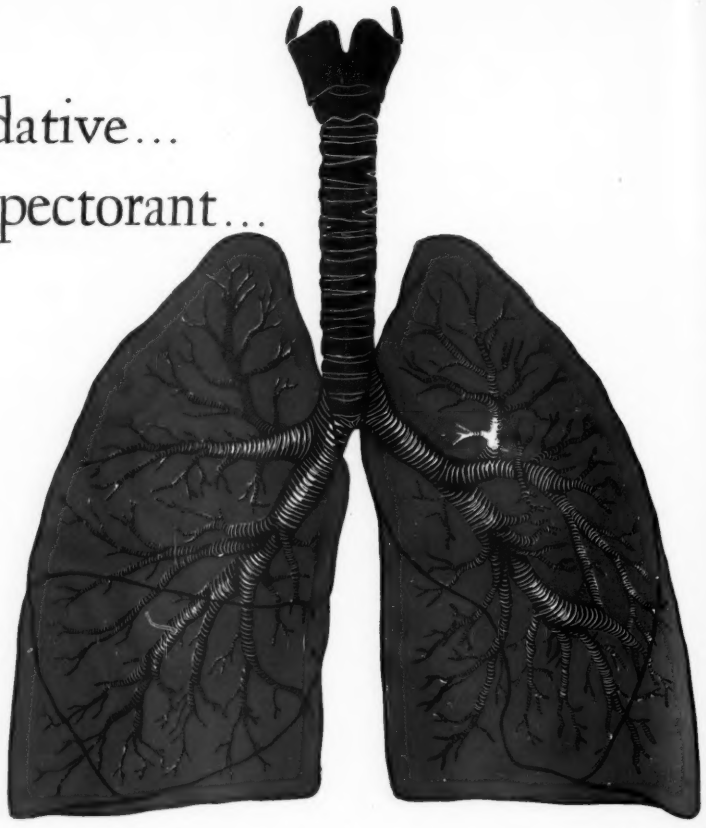
bronchial sedative...
bronchial expectorant...



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December, 1946

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The Illinois Medical Journal

Official Journal of the Illinois State Medical Society

EDITOR — Harold M. Camp. EDITORIAL BOARD — James H. Hutton, Chairman, Frederick H. Falls, Josiah J. Moore, Edwin M. Miller, Chauncey C. Maher, Harry S. Gradle, Harry Culver, Walter Stevenson, Raymond W. McNealy.

Editorials

COUNTY HEALTH DEPARTMENTS

During the past six months officers of the Illinois State Medical Society have received many letters asking for information concerning previous actions taken by this Society relative to county health departments, as provided under the Searcy-Clabaugh Act, which was approved in this state in 1943.

When the Searcy-Clabaugh Bill was introduced in the State Legislature, the Illinois State Medical Society approved the bill and this information was presented to the committee before which the bill was referred for study and subsequent hearings. Representatives of the Society appeared at these hearings at the request of the Chairman. The bill was subsequently passed and approved by the Governor.

Since its enactment there have been a considerable number of counties or one or more adjoining counties which have approved the program as outlined in the Act, and they have developed their own local health departments, these being supervised and operated entirely on a local basis.

At the annual meeting of the American Medical Association House of Delegates in 1942, a resolution was passed calling for the development as rapidly as possible of complete territorial and population coverage in the Continental United States with modern full-time public health organizations on a county, joint county, or district basis.

Within the past month a letter has been received in the offices of the secretaries of the state medical societies from the Bureau of Health Education of the A. M. A., with which was enclosed a copy of the A. M. A. resolution, and urging that each state society at the first opportunity present same before their own House of Delegates, to get either approval of a similar resolution or re-affirming of a previous action of a similar nature, so that all state societies will be on record in the same manner as the A. M. A., favoring the creation of local full-time health departments.

This is one of the points called for in the latest revision of the Platform of the American Medical Association, and it has already been approved by many of the constituent state societies since 1942. The Resolution as approved by the A. M. A. in 1942 is as follows:

"Whereas, a major inadequacy in the civilian health protection in war as in peace time continues from the failure of many states and of not less than half the counties in the states to provide even minimum necessary sanitary and other preventive services for health, by full-time professionally trained medical and auxiliary personnel on a merit system basis supported by adequate tax funds from local and state and

where necessary from federal sources; therefore be it

Resolved, that the Trustees of the American Medical Association be urged to use all appropriate resources and influences of the Association to the end that, at the earliest possible date, complete coverage of the nation's area and population by local, county, district or regional full-time modern health services be achieved."

The above is taken from the Proceedings of the House of Delegates of the American Medical Association held at Atlantic City, June 8-12, 1942.

Reports received from those counties in Illinois where full-time local health departments are now in operation, would indicate that in the majority of these localities the medical profession seems to be satisfied with the operation of the departments and believe that the public health is materially improved through their operation. In two or three counties there seems to be a difference of opinion on the part of the medical profession, and in one county where such a program has been in operation on a temporary basis, the society has not approved the plan.

In accordance with the request of the American Medical Association, the above resolution will again be presented before the House of Delegates of the Illinois State Medical Society at the 1947 annual meeting, with the accompanying letter for whatever action seems desirable by the members of the House. From reports received from other state medical societies in efforts to get their reactions of the program in their respective states, and their opinions of local health departments on a full-time basis, it seems quite logical to conclude that Illinois has been rather backward in developing the plan in this state.

In quite a number of states at the present time, all counties or practically every county

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within the individual states now has this health protection through full-time local health departments, and the vast majority of those to whom our letters were sent heartily endorse the program. If there are flaws in the present Illinois Act, which provides for the creation of local full-time health departments, these should be noted and should be called to the attention of our legislature at the next regular session, for Illinois should be a leader in all movements to improve the public health of its people.

A CENTURY OF PROGRESS IN ANESTHESIA

Throughout the world the centennary of the application of surgical anesthesia was celebrated on October 16, as Horace Wells and W. T. G. Morton, both dentists, on October 16, 1846, gave ether in a surgical case at Massachusetts General Hospital in Boston. The success of this application was publicized far and wide. Four years previously Crawford W. Long of Georgia began to use ether as an inhalation anesthesia, and in the four years following, until the publicization of the work of Morton, the outside world knew but little concerning ether as an inhalation anesthetic. Consequently many insist on giving Morton the principal credit for its use.

Sir William Osler, many years ago, stated that anesthesia was medicine's greatest gift to suffering humanity, and no doubt this statement is correct.

In recent years a sizable controversy has developed among those who believe that Morton and Wells deserve more credit for the establishment of inhalation anesthesia as a boon to humanity and a safe procedure, than the country doctor, Crawford W. Long, whose use of ether in this capacity predated the efforts of Morton-Wells by four years.

Regardless of who receives a priority rating for this achievement, there seems to be no logical reason for not giving credit to all three for their outstanding work and their courage in experimenting in a field which, up to that time, had not been given much consideration.

For many years the use of ether, chloroform and nitrous oxide in inhalation anesthesia was established as a universal procedure, although hypodermic injections for pain were first used in 1839. Cocaine injections for local anesthesia were first used in the early "'70's", then following this application, other local anesthetics were developed gradually.

Ethylene, cyclopropane and other gaseous anesthetics used by the inhalation method have been used since 1918, following the research work of Luckhardt and Thompson. In more recent years the use of intravenous anesthetics has been developed, these being members of the barbiturate family. Pentothal sodium has probably been the barbiturate of choice in intravenous anesthesia, usually administered intravenously in a 2½% solution, and from mild to moderate muscle relaxation is produced within less than one minute. This is of more value in securing relaxation of muscles of the extremities than in any other field. In view of the fact that in abdominal operations, to get complete relaxation, the dosage necessary so closely approximates the lethal dose, it is usually necessary to use some other anesthetic with it — and especially nitrous oxide inhalations.

Likewise in recent years the use of spinal analgesia has become a common procedure for many types of operations. The analgesia is confined to the area supplied by the nerve roots affected by the drug. Complete muscular relaxation is produced through its use, but on account of the tendency to produce hypotension, spinal analgesia is not advisable in cases of shock where immediate surgery is indicated. Although procaine is the drug usually preferred in spinal analgesia, there are a number of other similar preparations which may be used, the choice apparently depending upon the individual desire of the operator.

Efficient refrigeration has been used recently, especially in amputations of the lower limbs, and a considerable amount of literature on its use has appeared in medical literature during the past five years. Anesthesia and its proper and safe application are actually a development of the past century. Nearly every decade, especially since 1860, has seen the development of something new used as an anesthetic agent.

Beginning with the work of Long, Wells and Morton a century ago, we have seen the trends gradually change, with a period when much less ether was used than in other periods; today, however, there seems to be a return to the use of ether in many surgical procedures as the

anesthetic of choice. This apparently is well illustrated in the case of thoracic surgery, as many of the outstanding surgeons in this field rely on ether as the choice of anesthetics in many of the highly technical procedures in their field of work. Mortality statistics from such procedures as lobectomy, pneumonectomy, resection of the esophagus, and in the various types of operative procedures on the human heart, have all come down rapidly during the past ten years.

The past century has brought much to suffering humanity, for the relief of pain in general, and in making surgical procedures entirely painless.

No one today would venture to give an opinion as to what the next century may bring, but with recent progress in all branches of medicine and surgery, almost anything can be developed, so it is entirely possible that many of the dreaded diseases of today for which but little can be done, may respond favorably to some of the research developments of tomorrow.

CASE REPORTS FOR THE JOURNAL

The Editor has received recently for publication in the Illinois Medical Journal, some fine short case histories which will appear in future issues. Many physicians have unusually interesting cases which should be reported when properly worked up. The reports should be short and to the point.

This Journal has a competent Editorial Board composed of prominent members of the Society in different fields of work. When the Board meets to consider many problems in connection with the scientific presentations selected for publication, these case histories are also submitted by the editor for official action by the Board. Occasionally a case history is not approved for publication because it does not prove definitely the diagnosis as presumed by the writer, or for some other reason the Board considers of sufficient importance to withhold publication.

At a recent meeting of the Editorial Board, it was the unanimous opinion that we should have a regular section reserved in the Journal for case reports, and when a group is accumulated, they should be published as a definite section.

Also at this meeting the Editorial Board expressed a desire to have members of the Illinois State Medical Society express their opinions relative to the Journal, make criticisms and suggestions so that the desires of the members and what they prefer to see in their Journal, can be published each month. Any communications received by the editor in the future along this line will be referred promptly to the Board so that consideration may be given these requests.

The Illinois Medical Journal is owned and operated by the Illinois State Medical Society, and the Council is responsible for its publication each month. It is not the intention of those responsible for the publication of the Journal to make money from its pages, but to give the members what they desire along the line of scientific articles, editorials, correspondence of interest, and to carry several departments presenting information of interest to the readers.

During the past year the section, "News of the State" has been enlarged so that information concerning activities of the county medical societies and the individual members can be published each month. The reference committee in the House of Delegates to which the annual report of the editor was referred, heartily approved the enlargement of this section and recommended that it be continued along the same line in the future. The recommendation of the reference committee was unanimously approved by the House of Delegates as a whole.

It is hoped that members of the Society will write up their unusual case histories giving complete information of interest to readers, yet not occupying too much space, as the brief reports properly written are of the greatest reader value. These case histories should be sent to the editor and he in turn will refer them to the Editorial Board to give final approval for publication.

CALL FOR SCIENTIFIC EDITORIALS ELIGIBLE FOR $300 IN PRIZES

At a recent meeting of the Editorial Board of the Illinois Medical Journal, it was unanimously agreed that our Journal should published each month a scientific editorial, and that this information was to be given to the membership of the Society in an early issue of the Journal.

Several editorials of this type have been published, or will be published in the near future, and it is the desire of those responsible for the

publication of this Journal that members of the Illinois State Medical Society submit material of this type to the Editor.

It will also be recalled that during the present fiscal year which ends next May, awards will be made to the members submitting the best scientific papers for publication, or the best scientific editorials. The awards will be in two classes:

1. For the best written article to be passed upon by literary and scientific people.

2. For the outstanding piece of original work as presented in a paper.

It was specifically stated that this is to apply to original scientific articles and scientific editorials. For the first class a prize of $100.00 is to be awarded and for the second class the award will be $200.00. This recommendation of the Editorial Board was approved by the Council, and all papers and scientific editorials published in the July, 1946 Illinois Medical Journal, and all to be published prior to June, 1947, will be eligible for these awards.

Scientific editorials written by members of this Society will therefore be eligible for one of these awards, and it is hoped that a supply of editorials suitable for publication will be received in the near future.

NEW RULING FOR A.M.A. RESOLUTIONS

At the 1946 annual meeting of the American Medical Association held in San Francisco, a resolution was introduced which would make it necessary for resolutions to be introduced before the House of Delegates to be submitted to the Secretary-General Manager thirty days prior to any meeting of the House. They are to be published in the Journal of the American Medical Association as well as in the handboook sent to members of the House prior to the meeting.

The House of Delegates approved this resolution and it will be in effect for the mid-year meeting to be held in Chicago in December. In this resolution the Secretary of the A.M.A. is to write each constituent state medical society asking that resolutions to come before the House be sent to him as far ahead as possible before the meeting. He is directed to submit mimeographed copies of each resolution to the delegates so that each will have copies available and know what resolutions are to be discussed.

Many times in recent years delegates have introduced resolutions on the final day of the session asking that they receive immediate attention. But since they require more than a majority of the votes to be approved when not previously submitted, it is rare indeed when these resolutions are approved. Quite often these last minute resolutions are promptly tabled as there is no opportunity to refer them to committees and permit hearings which may be attended by members desiring to procure information concerning them.

This new arrangement seems to be a step in the right direction, and every delegate will have a copy of all resolutions, and will have an opportunity to go over them thoroughly and vote more intelligently when action is requested on the part of the House. This is a step which, in the opinion of many, could be adopted by the various state medical societies relative to resolutions to be submitted at the state level.

Each state society was urged to present this before its own House of Delegates so that all will know of the new ruling, and perhaps recommend that it be adopted at state meetings. Too often when long resolutions are presented and read before the House many members become confused. If copies were mimeographed and made available for all delegates so they could go over them thoroughly, no doubt wiser decisions would be made when issues come to a vote. This is unquestionably a step in the right direction and worthy of emulation in all state societies.

THE JOURNAL WISHES ITS READERS A

Happy New Year!

State Department of Public Health

INFECTIOUS DIARRHEA — A PUBLIC HEALTH PROBLEM

Statistics at best do not make for spectacular reading but there are some data which will interest every physician, nurse, hospital administrator and mother who has anything to do with infant care.

Infantile diarrhea, second only to acute respiratory diseases as a leading cause of infant mortality, was responsible for 135 deaths in Illinois during the first nine months of 1946. Forty-one of these cases were under one month of age while the remaining 94 were between one and twelve months. As seen in the accompanying table, these deaths showed no seasonal variation. The great majority occurred in 43 hospitals while an appreciable number took place in the home. They were not limited to any particular locality as deaths were reported from 37 counties scattered throughout the State. The total of 135 represents an increase of 8 over the number attributed to the same cause for the corresponding period of 1945.

Number of Infant Deaths Due to Diarrhea Reported in Illinois, January to September, 1946

Month	Place of Occurrence		Total
	Home	Hospital	
January	3	18	21
February	3	18	21
March	4	11	15
April	3	8	11
May	1	15	16
June	5	18	23
July	4	7	11
August	1	7	8
September	3	6	9
	27	108	135

Much of this mortality was due to outbreaks of diarrhea occurring in neonatal nurseries. Practically all diarrheal deaths under the age of one month and a small percentage of those in the two month age group were known to be due to infectious diarrhea. Thus approximately one-third of the deaths were due to this one cause alone. Undoubtedly the remaining two-thirds include other cases which may be attributed to a similar or the same infectious agent.

It is unfortunate that so little is known about the causative agent and mode of transmission of infectious diarrhea. In spite of numerous outbreaks throughout the country, facts relating to the etiology and epidemiology are few. Research now in progress promises to shed some light on the problem but to date reliance must be placed on the strict observance of acceptable techniques in nursery management. Infectious diarrhea outbreaks are explosive in character often with high case fatality rates. Present day crowding in hospitals and limited personnel add to the risk. It cannot be emphasized too strongly, therefore, that observance of acceptable techniques at all times is of paramount importance. Through this means only can the disease be limited to the individual case once it occurs. Herbolsheimer[1], in a recent review of infectious diarrhea, has outlined the factors contributing to the origin and spread of this disease and the steps involved in treament, prevention and control. The active interest of physicians, nurses and hospital administrators in the measures there proposed and prompt reporting of actual or sus-

1. Herbolsheimer, H., Infectious Diarrhea of the Newborn, Ill. Med. J., **90**: 6-9, July, 1946.

pected cases to public health authorities can help materially to reduce this loss of infant life.

To this must be added the need for informing mothers of newborn infants as to the significance of infantile diarrhea and the proper care of infants. Enlisting the services of a physcian promptly in the event of such illness will give physicians additional chances for saving infant life.

INFLUENZA VACCINE DEMONSTRATION

Army experience during the past year indicated that influenza vaccine was effective in protecting military personnel. This product now has become available for civilian use. Consequently the State Department of Public Health, in cooperation with the authorities of several universities and normal schools in Illinois, is taking advantage of this opportunity to test further the efficacy of this new immunizing agent. Studies will be conducted under the supervision of medical authorities at Northwestern University, University of Illinois and State Normal Universities at Carbondale and DeKalb.

The vaccine used combines Type A and Type B attenuated influenza virus. After a single subcutaneous injection of 1 cc., immunity develops within a period of several weeks. The duration of such immunity is relatively short, lasting probably 3 or 4 months. Reactions consisting of malaise, fever, and arthralgia, have been reported in so-called normal individuals but they are not serious and are usually of short duration. It is claimed that persons sensitive to eggs and those who have or have had active tuberculosis should avoid injections of this product.

Due to the relatively high cost of influenza vaccine and the lack of presently available funds, the State Department of Public Health is unable to distribute this material to physicians throughout the State. The limited supply for the present, therefore, will be confined this year to population groups were, because of unusual living or working conditions, the risk is greatest. Such conditions prevail in the educational institutions mentioned, and the results of the demonstrations will be viewed with considerable interest.

SYMPOSIUM ON CANCER

A five-day symposium on cancer, with special emphasis on early diagnosis and treatment, will be conducted by the Illinois Division of the American Cancer Society in Chicago, January 20 to 24. The program has been approved by the Council of the Illinois State Medical Society and the Illinois State Department of Public Health. The following committee is in charge of arrangements for lectures, conferences and clinics to be held at their respective medical schools:

Dr. Warren H. Cole, chairman
Professor of Surgery, University of Illinois
Dr. Alexander Brunschwig,
Professor of Surgery, University of Chicago
Dr. Loyal Davis,
Professor of Surgery, Northwestern University
Dr. Herbert E. Schmitz,
Professor of Gynecology and Obstetrics, Loyola University

Sessions on the fifth day will be held at Michael Reese Hospital. Special dinner meetings are planned.

Invitations have been extended to county medical societies with the request that physicians be recommended for attendance by each society. Attendance will be limited to thirty-six "downstate" physicians, selections being made in the order of receipt of application. The major portion of the expenses of physicians attending will be borne by the American Cancer Society.

The program will be repeated if indicated by the number of applications. Plans call for a similar symposium for Cook County physicians at a later date.

Correspondence

FELLOWSHIP IN A. M. A. IS RECOMMENDED

The American Medical Association is going to celebrate its centennial in Atlantic City, June 9-13, 1947. Elaborate plans are being made for this celebration.

Only Fellows and Invited Guests are eligible to attend. Membership in your state society is the primary qualification for Fellowship in the A. M. A. Fellowship dues and subscription to the Journal A. M. A. are both included in one annual payment of $8.00, which is the cost of the Journal to subscribers who are not Fellows.

If you are not a Fellow and plan to attend the Atlantic City session, which will be a milestone in medical history, you can save yourself considerable time and confusion when registering, if you will write now to the American Medical Association, 535 North Dearborn Street, Chicago 10, and ask if you are eligible to become a Fellow.

NATIONAL GASTROENTEROLOGICAL ASSOCIATION 1947 AWARD CONTEST

The National Gastroenterological Association announces its Annual Cash Prize Award Contest for 1947. One hundred dollars and a Certificate of Merit will be given for the best unpublished contribution on Gastroenterology or allied subjects. Certificates will also be awarded those physicians whose contributions are deemed worthy.

Contestants residing in the United States must be members of the American Medical Association. Those residing in foreign countries must be members of a similar organization in their own country. The winning contribution will be selected by a board of impartial judges and the award is to be made at the Annual Convention Banquet of the National Gastroenterological Association in June of 1947.

Certificates awarded to other physicians will be mailed to them. The decision of the judges will be final. The Association reserves the exclusive right of publishing the winning contribution, and those receiving certificates of merit, in its Official Publication, the Review of Gastroenterology. All entries for the 1947 prize should be limited to 5,000 words, be typewritten in English, prepared in manuscript form, submitted in five copies, accompanied by an entry letter, and must be received not later than April 1, 1947. Entries should be addressed to the National Gastroenterological Association, 1819 Broadway, New York 23, N. Y.

THE WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY PRESIDENT'S MESSAGE

It is traditional, at the beginning of a new year, to resolve hopefully on a better way of living, a better job done and fewer tasks left unfinished at the close of the year. As I bring you greetings, I hope that each of you will resolve to keep in mind the aims, ideals and purposes of the Auxiliary, and that you will accept them as your duty and obligation.

This year the Auxiliary has been asked to take up the job of "Selling an Idea" — the idea of voluntary medical insurance. The most urgent need is to put the Ten-point Program into action. The general public still needs to be educated to

the understanding that the patient loses the most under socialized medicine. It has been recommended that in carrying out this program, each Auxiliary should arrange study groups, and have their well-informed members ready at all times to present the plans to lay organizations in which they participate. May I urge that the Auxiliary members keep a close watch on all legislative matters.

Again the Medical Society has asked the Auxiliary to carry on in their collection of the Benevolence fund. It is our hope, and our sincere desire that the time will come when no one who needs this fund shall find it lacking because of our failure in making it adequate.

In closing I want you to know that I desire to work with you in every way possible towards the accomplishment of our objectives.

MRS. E. W. BURROUGHS

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1946-1947
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Original Articles

THE MANAGEMENT OF ACUTE CRANIOCEREBRAL TRAUMA

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The first five to six days following craniocerebral trauma are the most crucial, not only for the sustaining of life but for the preservation of the fullest possible neurologic and psychologic function. Effective management during this critical period requires the exercise of certain guiding principles and empirical considerations as they bear upon diagnosis, prognosis and therapy. The purpose of this paper is to present these in a manner comprehensible to the general practitioner and surgeon under whose care necessarily falls the bulk of such injuries.*

In the management of the most severe cases a wide background of experience in neurology and neurosurgery is, of course, a valuable asset. Yet for most cases such is not an indispensable prerequisite to competent management, and even if it were the very practical circumstance would still require to be met that the services of a trained neurosurgeon are not accessible to most communities; nor is it likely they will be for some time to come. The responsibility for administering early care to head-traumatized patients can scarcely be avoided by the active general practitioner and surgeon. With the exception of epidural hematomas and widely exposed vault defects with extruded brain, few conditions demand a neurosurgical procedure within the first 24 hours. But during this period the institution of appropriate conservative measures is urgently required and if so administered may well turn the tide in the patient's favor. Their neglect, on the other hand, may so imperil his condition as to render him irrecoverable even if expert help subsequently becomes available.

Motor vehicular and occupational accidents, blows and falls account for the great majority of head injuries[41]. Irrespective of the promptness and appropriate character of the treatment administered, 8-12 percent of hospitalized cases succumb within the first week owing to the gravity and irreversibility of the imposed brain insult[39, 40, 50, 61]. Of these, slightly over half die within the first 8 hours and 65 percent within the first 24 hours. On the other hand, some 70 percent of hospitalized cases survive, apparently irrespective of the mode of treatment so long as it is not negligent or actually nocuous. Relatively few cases, probably not more than 4-6 percent of an unselected group, can properly be considered to benefit from neurosurgical operations.†

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*No attempt will be made in this paper to deal with the special circumstances[21, 24, 26, 36] that require consideration in war wounds of the head. Nor will an attempt be made to describe actual operative techniques. Such are available in general and special text books[16, 26].

†The number of patients actually subjected to operation appreciably exceeds these figures, varying from clinic to clinic and from year to year within a given clinic. Thus, at Boston City Hospital, the overall operative rate for several years prior to 1938 was 36.9 percent[40], whereas at Bellevue and Kings County Hospitals the rate over a corresponding period remained under 15 percent. Some of the factors responsible for these disparities are (a) the selection

There remains, then, a group comprising 12-16 percent of hospitalized patients regarding whom the outcome for life and function depends upon the effectiveness of the conservative medical and nursing measures employed. It is for this group that the general practitioner should "point" himself.

If the concept be accepted that proper therapy depends upon proper diagnosis, it is incumbent upon the practitioner to equip himself as far as possible with those tools by means of which he may reliably infer from a study of the patient's disabilities the existence, character, site and extent of the responsible pathologic agent. Besides being able to elicit the more important signs and symptoms and to recognize their more familiar constellations, he must possess a useful fund of anatomic and physiologic knowledge and must keep clearly before him a mental catalogue of the numerous pathologic processes that may obtain in any given case. Against the latter he must constantly measure the demonstrable clinical findings. For this reason the overt and covert pathological findings that are most commonly encountered in craniocerebral trauma are itemized below.

MARKS OF VIOLENCE ON SCALP, FACE, NECK AND TEETH

I. Abrasions (including "brush burns") and contusions.

II. Lacerations and Avulsions
scalp, eyelid, globe, iris, nose, pinna, lip, tongue, gum and cheek (external and/or mucosal aspects).

III. Ecchymoses and Edema
A. General: scalp, facial and neck tissues.
B. Special:
1. Periorbital (if delayed, suggests fracture of frontal bone, base and/or vault)
2. Postauricular (if delayed, is presumptive evidence of fracture of petrous-temporal bone — "Battle's sign")

IV. Subcutaneous Emphysema
1. Forehead (with fracture into frontal sinus)
2. Cheek and Nose (with fracture into antrum)
3. Neck (with tracheal fracture and lung puncture)

V. Hemorrhage
A. Free:
1. Lacerations and Avulsions
2. Epistaxis
3. Pharyngeal
4. Middle Ear

(2, 3, 4: All suggest basilar fracture; and if associated with cerebrospinal fluid are conclusive evidence thereof.)

B. Trapped:
1. Subaponeurotic (cephalhematoma)
2. Intra-ocular
3. Retinal (with or without detachment)
4. Retropharyngeal (suggests cervical fracture-dislocation)
5. Tympanic cavity (without rupture of drumhead)

VI. Imbedded Foreign Bodies
dirt, gravel, cinders, twigs, fragments of glass, stone, wood, metal, pieces of hat, etc.

VII. Loosening, fractures and evulsion of teeth.

It not infrequently happens that unconscious patients lacking a satisfactory history are brought to the physician's attention. These cases raise the entire problem of the differential diagnosis of coma of which craniocerebral trauma constitutes but one item. The absence of marks of violence should not be interpreted as excluding severe cerebral trauma and, on the other hand, their mere presence should not deceive the examiner into supposing that craniocerebral trauma is the sole or even the major responsible factor at work. Obviously, syncopes arising from many causes — diabetes, hyperinsulinism, apoplexy, cardiac catastrophe, drug intoxication, etc., — may be complicated by a fall and the latter may produce external marks of violence which have no significant cerebral counterpart. Again, cerebral trauma secondary to a fall may be added to the original cause of syncope. A wary and self-critical attitudinal set will serve the diagnostician well in all such instances.

of patients for hospitalization; (b) the diagnostic skill of the staff; (c) the indications adopted for surgical intervention; and (d) the interpretation as to what kinds and magnitude of lesions may be successfully dealt with by operation.

Fig. 1. Compound, Comminuted, Stellate Fracture of Parietal Vault. Note Subaponeurotic Hematoma overlying Fracture Site.

Fig. 2. Linear Fracture of Parietal Vault with Dehiscence of Interparietal suture at Vertex of Skull.

INJURIES TO THE BONES OF THE SKULL, FACE AND NECK

A. Fractures of Skull (Simple and Compound). Located as of the Vault, Base or Both. (Figures 1, 2, 3)
   1. Linear
   2. Penetrating
   3. Perforating
   4. Comminuted
   5. Stellate, Bursting
   6. Depressed (linear, comminuted, pond, gutter and disc types)
   7. Dehiscence of sutures

B. Fractures and/or Dislocations of Face (Simple and Compound) Located as of the Nose, Malar bone, Maxilla, Zygomatic arch, Glenomaxillary joint and Mandible (usually bilateral)
   1. Linear
   2. Penetrating
   3. Perforating
   4. Comminuted
   5. Depressed

C. Fractures and/or Dislocations of Cervical Spine (usually simple and at C5-6), with or without spinal cord dysfunction. (Figure 4)
   1. Compression ("wedging") of body
   2. Facets, pedicles, laminae, odontoid process
   3. Anterior or posterior subluxation with ligamental tears.

Orificial bleeding should immediately suggest to the examiner the possibility of fracture of the base of the skull, compounded through the paranasal sinuses, middle ear or mastoid cells. Epistaxis and pharyngeal bleeding suggest basilar fracture into the anterior and middle fossae, whereas aural bleeding is presumptive of fracture into the middle or posterior fossae. In the latter fractures, appreciable bleeding from the fracture lines will rupture the drumhead and appear in the external canal. Smaller amounts however may not break through but can be recognized as bulging, bluish-red drum head ("hemotympanum"). The orificial discharge of cerebrospinal fluid or the latter mixed with blood permits a positive diagnosis of basilar fracture, irrespective of the x-ray findings.* The admixture of cerebrospinal fluid with a grossly bloody discharge may be detected by allowing a droplet

*Vance showed in an extensive series that over 25 percent of basilar fractures demonstrated at necropsy escaped detection by X-rays[84].

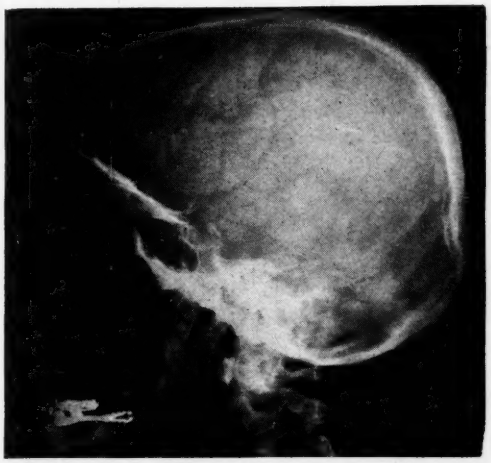

Fig. 3. Depressed Fracture of Occipital Bone, Pond type (of degree not sufficient to require elevation).

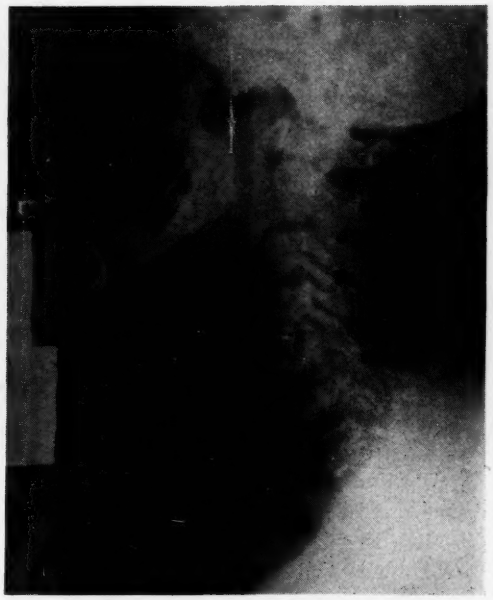

Fig. 4. Fracture-dislocation of 6th Cervical Vertebra with posterior displacement due to blow on Forehead. This patient had a Cervical Hematomyelia and Tetra-Paresis.

to fall on the pillow case. The rapid development of a clear "wet" ring peripheral to the red stain betrays the presence of cerebrospinal fluid.

The not uncommon association of injuries of the cervical spine and cord[13] with head injuries and the frequency with which such complications are overlooked require special comment. Fracture-dislocations of the cervical vertebrae and, in less severe cases, symptomatic myositis and ligamentitis, are particularly easily produced when physicial violence is delivered to the forehead, nasion or fronto-vertical regions. Abrasions at these sites should put the clinician on guard against cervical complications. Nuchal pain and rigidity may be wrongly interpreted as indicative of meningeal irritation due to subarachnoid bleeding, and the neurologic consequences of concussion, edema or hemorrhage of the cervical cord may be erroneously imputed to the brain injury.

On occasion, a cervical dislocation may be momentarily produced by a frontally-delivered impact. Such may spontaneously reposit, yet leave behind it serious neurologic deficits. X-rays of the cervical spine, being non-revelatory, may then mislead the unwary examiner. In cases of this sort, bulging of the posterior pharyngeal wall as demonstrated by clinical examination or röentgenography is strongly suggestive of occult retropharyngeal hemorrhage secondary to a tear of the prevertebral soft tissues.

INJURIES TO THE INTRACRANIAL CONTENTS

(Brain, Meninges, Blood and Blood Vessels, Cerebrospinal Fluid and its Cisterns, Ventricles and Channels)

I. Concussion ("Commotio Cerebri")

II. Laceration and Contusion (direct; contrecoup)
   1. Dura mater and/or venous sinuses
   2. Pia-arachnoid
   3. Cortex (cerebral and/or cerebellar)
   4. Brain stem

III. Hemorrhage

A. Collections of Magnitude Amenable to Surgical Removal:

1. Epidural (anterior and middle meningeal arteries)

2. Subdural (commonly of venous origin; but may be from smaller arteries or arterioles and lacerated cisterns)
   a. Hematoma
   b. Hemohygroma

3. Intracerebral (in cerebral hemispheres and cerebellum only; those of medulla, pons, midbrain, thalamus and basal ganglia are not amenable to surgery)

4. Intraventricular (only occasionally successful and must be done early)

B. Extravasations, Punctate and Interstitial Hemorrhages, Diffuse or Focal — Not Amenable to Surgical Removal.
1. Subarachnoid
2. Subpial
3. Intracortical
4. Intracerebral (including corpus callosum)
5. Within pericellular spaces and perivascular spaces of Virchow-Robin

IV. Brain Edema
1. Diffuse
2. Focal
3. Circumferentially Spreading
4. "Persistent" type of Trotter[51]

V. Intramolecular Derangement*
1. Sluggishly reversible with minimal outfall of cells
2. Irreversible with much outfall of cells.

With respect to certain of the above-itemized lesions, e.g., epidural, subdural and gross intracerebral clots, one encounters little difficulty in imagining a direct pathophysiologic relationship between the morbid process and clinical manifestations. Such interpretations, however, may not altogether encompass the pathogenetic circumstances actually in process. There is a lamentable readiness on the part of some pathologists and surgeons to regard other readily demonstrable lesions, such as cerebral contusion and laceration, subpial, subarachnoid and diffuse petechial hemorrhages, and variform zones of edema, as sufficient explanation of the symptomatology, clinical course and death of the patient. Serious reservation as to the tenability of these uncritical accounts was expressed in a previous article (9) on the grounds that (a) in fatal cases it is often impossible to demonstrate such lesions and (b) in non-traumatic diseases, cerebral surgery frequently results in laceration, contusion, edema and subpial and subarachnoid hemorrhages without producing clinical manifestations comparable to those met in the injured patient. It would appear, then, that not withstanding the concomitant presence of gross lesions, craniocerebral trauma commonly imposes upon the brain an occult factor (or set of factors) the pathogenetic significance of which may in some instances surpass that of the readily identifiable lesions and which in any case requires recognition. In the average discourse on head injuries, such common denominators as cerebral concussion and intramolecular derangement† are not given the emphasis they deserve. This practice does not, of course, make them less genuine or less dynamic pathogenetic factors.

In the past, the term concussion has been loosely used, at times referring to the mechanical jarring (*commotio cerebri*) of intracranial contents, at others to the disorders of function and clinical disturbances, and at still others to the pathologic findings in the brain. Fortunately, recent physiologic and histologic studies [2, 18, 19, 45, 55, 59, 60] have made it possible to formulate a self-consistent account of concussion in the following manner. Physicial violence to the head imposes a mechanical force directly upon larger or smaller masses of nerve cells. The dissipation of this force is in accord with the laws of hydrostatics and hydrodynamics, with certain minor qualifications arising from anatomic and torsion factors. The result is a generalized and fairly simultaneous discharge of stored neural energies, i.e., "depolarization" of the cell membranes occurs, whereupon there obtains an intense but short-lived excitation of the muscles and glands upon which the activated neuronal axones ordinarily play. Immediately thereafter a period of extinction of neural function supervenes [20, 37, 55] involving mainly the "higher" (suprasegmental) structures of the brain. The clinical counterparts of these "excitatory" and "paralytic" components of concussion consist of brief tonic spasm, alterations of respiratory and cardiovascular functions, temporary impairment of consciousness and loss of corneal reflexes. Mild confusion, dizziness and headache may supervene after the paralytic phase passes.*

*Refers to ischemia, hypoxia, hypoglycemia, retention of catabolites, intra-cellular fluid imbalance, acid-shift of pH, positive and negative "voltage drifts," extinction, cell membrane depolarization, dysfunction of intracellular respiratory pigment-enzyme systems and other as yet unidentified or poorly defined colloid-crystalloid relationships[32, 39, 28, 37, 49, 33].

†The present writer supposes that all gradations of intramolecular derangement from reversible to irreversible may be induced by traumatic violence and that the term "concussion" properly applies only to the quickly reversible and therefore least nocuous degrees of intramolecular derangement. On this view, the clinical diagnosis of concussion necessarily is and must remain an ex post facto affair.

*This account effectually displaces the older anemic[31, 32],

In concussion as here conceived, gross pathological changes are rarely demonstrable. Microscopic findings, although subtle, appear early (within 30 seconds) and are considered by Windle[59,60] to represent a highly characteristic form of chromatolysis. Such changes reach their maximum at 7-8 days and regress rapidly thereafter. In the more severe traumas, less readily reversible degrees of intramolecular derangement are produced and focal or diffuse microscopic hemorrhages are demonstrable within and upon the surface of the brain. These interfere with the circulation of blood and the egress of cerebrospinal fluid, the consequence of which is the cellular respiration becomes deficient and the usual perverted response of cells to anoxia is discernible, namely, the uptake of tissue fluids. Edema is the result and in its turn it mechanically comprises the vascular radicals of neighboring tissues, completing the cycle of ischemia, hypoglycemia, and anoxia. Hand in hand with these changes, a process of cellular outfall and encephalomalacia may rapidly develop so that within the first week a previously normal ventricular system may show progressive dilatation. The latter may advance for several months after clinical recovery has been established. (Figure 5)

Fig. 5. Pneumoencephalogram, antero-posterior view, after a moderately severe craniocerebral trauma, illustrating "Hydrocephalus Ex Vacuo" due to encephalomalacia and gliosis. Periodic visualization of the ventricles was begun 9 days after injury and demonstrated a progressive dilation from near-normal to the condition shown above. Compare with Fig. 6, page 324.

In virtually all instances, the clinical signs and symptoms encountered in cases of head injury are directly or indirectly ascribable to the pathologic processes catalogued above. Our endeavor to deal with the important matter of diagnosis will be advantageously served at this point by reviewing the clinical manifestations that may be subtended by such processes. These are

I. Modifications of the State of Consciousness:

A. Psychomotor and emotional activities.

Maniacal, Thrashing, Shouting

Combative, Negativistic, Resistive, Spitting

Hypomaniacal, Excitable, Delirious

Resistive, Insomnic, Voluble

Normal

Apathetic, Inaccessible

Bradykinetic, Random and Semipurposive movements

Somnolent, Stuporous

Comatose, Preagonal "coma vigil".

B. Intellectual and Social Activities.

Confusion, Disorientation, Dulled Perception

Inappropriate Behavior

Aphasia

Amnesia

a. *anterograde (for events following injury)*

b. retrograde (for events just preceding injury)

Distractibility, Inattentiveness

Repetitiveness, Perseverativeness

Incontinence of stool and urine

Diurnal and even hourly variations between the farthest extremes of responsiveness are not infrequently observed. Such swings should always be regarded as evidences of grave insult.

anoxic[24] and paralytic[17, 18] theories regarding which there were always serious objections. No doubt the older theories will prove to possess much merit in explaining those phenomena sequential to concussion.

II. Vegetative Disturbances:

1. *Blood Pressure* (normal; increased: decreased; instable)
2. Pulse Pressure (normal; instable; early, over 50; late, under 25)
3. *Pulse Rate and Character* (normal, *bradycardic; tachycardic; instable;* bounding; thready; coupled)

Respiratory Rate, Depth and Character (early, "stertorous" — slow, deep and *noisy; late, rapid, shallow;* inspiratory phase shorter than expiratory; mucus present or absent; hiccoughing).

5. Temperature (hyperthermia, average 101-104° F.; if uncombatted may reach *107-109° F.)*
6. Upper gastro-intestinal tract (nausea, *vomiting, regurgitation of bile)*
7. Skin —
   (a) Anhidrosis, unless complicated by toxic or infectious processes.
   (b) Flushed or cyanotic head, neck and chest. Preagonal mottling of extremities.
   (c) Goose-flesh in decerebrate states and other severe injuries.
8. Sugar Metabolism (hyperglycemia, glycosuria)
9. Sphincters — incontinence of stool and urine

III. Somatic Neurological Manifestations:

A. General Signs.
1. Headache (its locus is not a reliable index of the site of lesion)
2. Blurred vision, photophobia
3. Internal strabismus, Diplopia, 6th *Nerve palsy*
4. Vertigo, Incoordination, Tinnitus
5. Epileptiform and Decerebrate seizures

B. Meningeal signs (usually due to subarachnoid blood)
1. Headache, photophobia
2. Nausea, vomiting
3. Fever (101°-103° F.)
4. Stiff neck, extensor hypertonus
5. Kernig and Brudzinski signs
6. Moderate leukocytosis

C. Focal Signs, expressed as dysfunctions of—
1. Cranial Nerves (particularly the 8th, 7th, 6th, 3d and 2d)
2. Motor power and muscle status
3. Reflexes, deep and superficial
4. Coordination, *non-equilibratory and* equilibratory.
5. *Sensation, general and special forms, deep and superficial modalities.*

Neurological signs may be conveniently *thought of as subtended by irritative* or *paralytic* lesions. The former appear as exalted or perverted functions, e.g., hypersensitivity, twitchings, and focal or generalized seizures. They commonly signify early or incomplete neural damage. The latter appear as depressed functions, e.g., hyposensitivity, dyspraxia, paresis or *paralysis. They commonly signify late or complete* neural damage. There is obviously much *overlapping between the two.*

It is particularly important that the physician evaluate the pupillary, extraocular and visual functions at frequent intervals. The side on which a lesion exists is frequently (though not invariably) betrayed by a dilatation of the *ipsilateral* pupil and lateral rotation of the eyeballs *"toward the lesion."*

Unfortunately, two circumstances not easily capable of circumvention seriously interfere with attempts to postulate pathologic lesions from clinical findings. The first is that *multiple lesions are the rule,* and its consequence is that classical clinical syndromes are frequently *"masked."* The second is that irrespective of the completeness with which the clinical neurological signs and symptoms are explored, the nature of the underlying pathologic process cannot be reliably inferred therefrom. This is because *neurological signs and symptoms are essentially manifestations of a disturbed physiological mechanism* and are therefore much alike, regardless of the agent which produces them. Thus, the hemiplegia resulting from a massive extradural clot cannot be readily differentiated from that resulting from cortical laceration, cerebral edema, depressed facture, intramolecular derangement, apoplectic hemorrhage, embolism, tumor, abscess or encephalitis. The *locus* of the morbid process may be reasonably inferred,* but the clinical fea-

*Even in the matter of localization, unsuspected factors may intrude and mislead clinical interpretation. For example, a large subdural clot may cover the right cerebral hemisphere without producing perceptible dysfunction of the adjacent cortex. It may nevertheless so far displace the brainstem as to cause the left peduncle to impinge against the tentorium cerebelli. The consequence may be the appearance of positive neurological signs in the limbs ipsilateral to the lesion.

tures of hemiplegia — spastic paralysis, hyperactive tendon reflexes, Babinski sign, absent abdominal reflexes, etc. — in no sense betray the pathologic nature of the lesion.

All this being generally recognized, attempts have been made to discover a correspondence between the sequential course of neurological signs and symptoms, and specific pathologic lesions. These efforts, emerging in the form of "clinical entities" and "syndromes", have met with varying degrees of success. They have been abundantly exploited in textbooks without sufficient stress being laid upon the fact that their greatest utility is in the presence of a "pure" lesion. Even under ideal circumstances they do not *make* a diagnosis; they merely indicate its probability. Their general applicability to the problem of discovering the nature of a pathologic lesion is seriously interfered with by the fact that in the majority of patients multiple rather than pure lesions prevail.

We may examine in this connection the syndrome of epidural hemorrhage, the essential features of which consist of unconsciousness from the time of injury, prevailing for a varying period (commonly 3-20 minutes) and followed by a lucid interval; thereafter, the gradual development of unilateral headache, somnolence, stupor and coma; all attended by enlargement of one pupil, conjugate deviation of the eyes toward the side of the clot, paresis and increasing spasticity of the contralateral limbs, vomiting, rise in blood pressure and fall in pulse rate. This is certainly the best known and very likely the most reliable of the traumatic syndromes. Yet every neurosurgical service can show case histories (a) in which no suspicion of the lesion ever arose clinically, the surgically-amenable lesion being disclosed (to everyone's embarrassment) at the autopsy table[54], and (b) in which the clinical syndrome appeared to be fully in evidence but in which at operation or necropsy an epidural clot was not disclosed, there being encountered instead a subdural or intracerebral clot or merely a local contusion attended by brain edema[7].

Another entity that has gained a seemingly inviolate place in the textbooks is that of "brain compression due to increased intracranial pressure". It is asserted that from the observation of a rising blood pressure, falling pulse rate, slowing of respiration and deepening stupor the clinician may reliably infer the existence, degree and progression of increased intracranial tension. It is further claimed that from these data may be derived criteria which indicate the appropriate type of therapy, whether conservative or operative. The extreme unreliability of such schemata and the serious errors that follow reposing confidence in them have been demonstrated by clinical and experimental studies[7,8,9,38] and will not be reiterated here.

Even greater uncertainty attaches to the more nebulous clinical syndromes of acute subdural hemorrhage[32], traumatic subarachnoid hemorrhage[26], etc. Recent writers have been impressed with the limitations of these concepts and have urged that good clinical judgment rather than adherence to rule-of-thumb guides constitutes the most valuable asset in caring for patients with craniocerebral trauma[9,16,21,30].

At this point of our inquiry we appear to have reached an impasse. Proper treatment, it has been asserted, depends upon proper diagnosis; and the latter consists in a process of inference by which the nature of the pathologic lesion is adduced from the clinical manifestations. But, as we have seen, the pathogenesis of neurologic manifestations is such that inferences as to the nature of the responsible pathologic agent cannot be implicitly trusted. Fortunately, there is a way of circumventing this impasse and it consists simply of recasting traditional goals in more dynamic and attainable forms. Instead of groping among a welter of clinic signs and symptoms for the stuff from which a mental image of the patient's pathologic lesion may be fashioned, the clinician is urged to set his course by the following principles: first, that no case come to autopsy with a clinically unrecognized and unoperated surgically amenable lesion; second, that the number of cases subjected to operation and proving to have a non-surgically amenable lesion be held at a minimum; and, third, that to all cases the most rational and effective therapy available in present-day medicine be administered.

A corollary to these formulations is that the clinician constantly keep before him the neces-

In actuality, the principle of contralateral representation has not been violated here, but the manner in which interpretation may be equivocated by an undemonstrable factor is clearly illustrated.

sity of deciding *whether* and *when* conservative measures should be supplemented by surgery. The lesions that commonly demand surgical attention in the early days following trauma are as follows: (1) compound fractures of the vault, with or without depression indriven, bony fragments, foreign bodies, devitalization and/or extrusion of brain tissue; (2) simple depressed fractures of the vault such that the outer table of the depressed portion is at or deeper than the inner table of the adjacent vault; (3) epidural hemorrhage; (4) subdural hemorrhage or hemohygroma; and (5) massed intracerebral and intraventricular clots. The first two of these rarely present diagnostic difficulties, being in many instances immediately apparent or at least strongly suspect from external signs alone. They are readily confirmable by x-ray. Of the last three, epidural hemorrhage is, of course, the most urgent. When their presence is conjectured, empirical procedures may be pressed into service to aid in resolving the diagnostic issues.

Upon admission, the patient is carefully examined and a "base-line" consisting of a record of the vital signs, state of responsiveness and general and neurologic examinations is established to which all future findings are referred. Definitive management now begins.

Shock. If shock is present, its management takes precedence over that of all other concomitant conditions. The standard measures for combatting shock are sufficiently well known to make their reiteration here unnecessary. For reasons that will be set forth below, morphine, generally considered an integral part of the treatment of shock, is contraindicated in head injuries. Similarly interdicted is the practice of lowering the head below trunk level. This posture facilitates the development of intracranial venous stasis and cerebral hypoxia.

Shock ascribable to head injury *per se* is, as a matter of record, uncommonly encountered, being present soon after admission in less than one percent of cases at Kings County Hospital. This statement should not be construed to mean that shock is rarely produced by head trauma, for it is obviously true that severe shock may kill almost instantaneously or within 10-15 minutes. It merely expresses the fact that if the initial shock produced by head trauma *per se* is not severe enough to kill quickly, it is rapidly recovered from. The result, in the vast majority of instances, is that by the time the patient reaches medical help he is either altogether out of the shock or is rallying from it. It has been our experience that among the approximately 6-8 percent of head-injured patients who upon admission present the picture of shock or develop it shortly thereafter, the great majority prove to harbor an *extracerebral* cause. The latter includes damage to the lungs, liver, spleen, adrenals, kidneys and bladder, fractures of the ribs, vertebrae, pelvis and long bones, burns, exposure to cold weather, exhaustion in hot weather, depleted nutritional states, severe alcoholic or drug intoxications, exsanguination from lacerations of the scalp, viscera or large vessels of the extremities, etc.

If active hemorrhage is present, it should be stopped by digital compression, pressure bandage, tourniquet, hemostatic clamp or mattress sutures. The neighboring parts should be shaved and the wound cleansed with some innocuous antiseptic, such as Zephiran[48]. Alcohol-containing agents may devitalize the tissues. Before closure, a few crystals of sulfanilamide may be sprinkled in and upon the wound. A dry gauze dressing is applied.

Other than active hemorrhage, the only condition that demands immediate attention is impending asphyxia and this can usually be combatted by arranging the patient in a position such that the tongue, pharyngeal secretions, blood and vomitus can gravitate away from the pharynx. The classical Shäfer resuscitation position is ideal for this purpose.

Transportation. Experience has established that the cranially-injured tolerate transportation well, even over distances of 50 to 150 miles. It is certainly far better to transport the patient to a hospital where the facilities for sustained observation, proper medical and nursing care and, if indicated, prompt surgical intervention are available than to retain him at the first stopping-place under the mistaken apprehension that moving him will seriously jeopardize his chances of recovery.

Once transportation has been decided upon, two practical points require consideration; first, that in being transferred between bed and stretcher, the patient should be moved smoothly and firmly in "log-fashion", the sagittal planes

of the head, shoulders and pelvis being maintained in strict alignment; second, that during the trip he be kept in the Shäfer posture.

Position. Upon arrival at the hospital the patient is moved to a quiet room and the head of the bed is raised about 20 degrees above the horizontal. He is placed well over on his side. Prophylaxis against hypostatic pneumonitis and decubitus is then instituted by turning the patient from side to side every two hours.

Protection. Confused, refractory, hyperactive and stuporous patients may imperil their welfare by climbing or falling out of bed, by removing dressings, oxygen catheters, Levine tubes, etc., and by thrashing about. Sedation in such cases may not prove wholly effective, in which event sideboards and restraints will be required. The camisole is by far the most effective and innocuous form of restraint. Somewhat less satisfactory, though usually more readily available, are leather cuffs or strong muslin bandage ties applied to the wrists and ankles. If abrasions, cyanosis and edema are to be avoided, proper underpadding and secure anchorage without slack are precautions that must be exercised. Rolled sheets are incapable of restraining vigorously active patients and if improperly applied they may choke the patient or seriously damage the large nerves and vessels in the axillae. Their use is therefore emphatically condemned.

Vital Signs. Readings of the blood pressure, pulse rate, respirations and temperature should be recorded every 15 minutes as long as variations of clinically significant magnitude are in evidence. If and when physiologic stabilization is established, the interval between successive readings may be increased. A pulse rate of 50 to 60 beats per minute is not uncommon after even mild head injuries and may persist for weeks. In itself it need not arouse much concern. The same may be said of a respiratory rate ranging in and about 12-14 cycles per minute. However, blood pressures above 160/100 and less than 80/50 and hourly fluctuations of blood pressure, even when they occur within these limits, constitute untoward signs. In the same manner, instability of the pulse and respiratory rates must be regarded as untoward signs. The appearance of respiratory cycles in which the rate and depth build up to a peak and then taper off every few minutes is to be looked upon as a forerunner of the Cheyne-Stokes pattern and carries a guarded prognosis.

Pulmonary Ventilation. An ever-present awareness of the importance of oxygen-exchange to the sustenance of neural fuction is indispensable to proper management. The neural respiratory mechanism is far more susceptible to insult than the cardiovascular[10,17,38] and it has been convincingly demonstrated that if proper respiration is maintained, the neural cardiovascular mechanism can be relied upon to carry out its functions with machine-like efficiency. As soon, however, as hypoxia is permitted to develop, untoward circulatory changes supervene, e.g., rise in blood pressure, widening of pulse pressure and bradycardia. Ultimately these break over into circulatory collapse[10]. Where oxygenation is satisfactory there is no necessity of giving pharmaceutic support to the cardiovascular system in the form of digitalis, caffein, adrenaline, ephedrine, etc.

The on-the-side and Shäfer postures recommended above greatly facilitate respiratory exchange by allowing the tongue to gravitate forward. If mucus collects in the pharynx and larnyx it is to be aspirated by a "fishing" technique through a No. 14 French catheter connected to a suction pump. Lax or edematous lips and nasal obstruction due to dried blood in the nostrils may force a patient to bring the accessory respiratory muscles into play and an oxygen debt may be slowly built up. In such cases, a metal air-way often allows prompt relaxation. By the use of this simple device the writer has often seen vegetative instabilities and neurologic dysfunctions melt away. Slight adjustments of the head on the pillow will often make the difference between effortful and relaxed breathing.

At the first sign of cyanosis, oxygen should be administered under a pressure of 7-10 liters per minute. The nasal catheter technique of administration is less cumbersome than the oxygen tent and for physiologic purposes is almost as effective.

Neurologic Examination. The importance of establishing a base-line of neurologic findings as soon as feasible following admission is self-evident. Subsequent developments may be advantageously measured against it and impressions may be formulated as to whether the pa-

tient is gaining or losing ground. Deepening stupor and the progressive development of pupillary disparities, squints and conjugate deviations of the eyes, aphasia, paralysis, spasticity, twitchings and convulsive phenomena constitute the chief "danger signs" from the neurological standpoint.

X-ray Studies. If during the first few days the patient's general and neurologic condition is satisfactory, the clinician need not be greatly exercised over resolving the question as to whether or not a skull fracture exists. Certainly the prognosis in a given case is not much modified thereby, for the patient's condition depends much less upon his skull injury than upon the concomitant cerebral damage. While it is in general true that the presence of a skull fracture is a rough quantitative index of the physical violence delivered, clinical experience bears out the significant points that (a) on occasion linear and stellate fractures may occur without the patient's being rendered unconscious and without the supervention of neurologic or psychologic dysfunction; and (b) severe and fatal brain injuries often occur without accompanying skull fractures. The therapeutic regime adopted in a given case is posited upon what is conceived to be amiss with the brain — or with what may ultimately arise therefrom (infection, cicatrices, paralyses, convulsions[43], etc.). Even when it is necessary that surgery be directed at the elevation of a depressed fracture, the removal of indriven fragments of bone, or the debridement of a compound comminuted fracture, what is done to the bone as such has little bearing on the patient's condition. This is not intended to imply that x-rays should not or need not be taken. The demonstration of depressed and indriven bone fragments, foreign bodies, compound fractures of the sinuses[47] and linear fractures across the course of the middle meningeal artery may indeed prove to be of considerable diagnostic value; and the interest of future litigation is necessarily concerned with a determination as to the existence of demonstrable fracture. Nevertheless, it is but rarely necessary to hurry the newly admitted patient to the x-ray table and in the great bulk of cases röentgen examination may well be postponed until the third or fourth day.

Laboratory Studies. Soon after the patient's admission, a routine urinalysis and complete blood count should be carried out. In the more severely injured cases, a blood sugar and N P N determination is desirable. Wasserman tests are routinely done in some neurosurgical clinics. In all cases in which alcoholic intoxication is under suspicion, the determination of the alcohol content of the blood should be made *early*.

Temperature Control. One of the conspicuous clinical features of severe brain injuries is the development of an anhidrotic fever. It is important to recognize that in and of itself this hyperthermia may kill the patient. With the sweating function in abeyance, the dissipation of heat from the body is accomplished chiefly by means of respiration and the physical mechanisms of conduction and radiation. It is understandable that at ordinary room temperatures and in hot weather the latter are not very effective, for they depend upon the existence of a steep gradient between the patient's temperature and that of his environment. Every precaution must therefore be taken to keep hyperthermia under control. The room temperature should be held at 55-60° F. Following the patient's admission, rectal temperatures are taken every two hours. Provided the successive readings are near-normal, stabilized, or falling in the direction of normal a temporizing policy may be adopted and the interval between reading may be increased. But whenever the temperature exceeds 102.5° F., active measures should be taken to combat the fever. The patient is stripped of covers and bed clothes, an electric fan is played upon his exposed body and sponging is instituted, employing a washcloth moistened in a tepid "50-50" solution of alcohol and water. This process is continued until the rectal temperature falls below 101.5° F. It is re-instituted whenever the critical level of 102.5° is exceeded. If, after an hour or so of sponging, the temperature fails to recede or if it continues to rise, a second method of attack is resorted to, namely, the colonic instillation of cool water. A necessary preliminary to this procedure is the simultaneous determination of rectal and axillary

temperatures. This permits the establishment of an "axillary-equivalent" of rectal temperature. A tube is now inserted some 18 inches into the colon and 3-5 liters of cool tap water are caused to gravitate into the large bowel. The colonic tube is then clamped off for eight minutes at the end of which period the water, by now warmed, is siphoned off and replaced by a second instillation. This process is repeated until it is estimated that the rectal temperature has fallen to 101.5° F. Meanwhile, large doses of aspirin (30-50 grains) may be administered. On occasion this drug has a highly salutary effect. Should the second line of attack fail, a final resort is made to ice-packs. The clinician must live out the conviction that in head injuries, as in heat stroke, *hyperthermia must be effectively controlled by one device or another* else the fight will be lost on this ground alone.

Orificial Bleeding. Bleeding and the escape of cerebrospinal fluid from the nose or ear need not excite alarm. In the majority of instances spontaneous cessation occurs within few hours or days. Operative intervention is rarely necessary during the first 3-4 days. The involved orifice may be washed or swabbed out as occasion demands, but packing, medicinal instillations and irrigations are strongly interdicted, for they may establish a pyogenic meningitis. The patient's posture should be such as to favor gravitational drainage and he is urged to suppress coughing and sneezing. Penicillin in 20,000 unit doses should be injected intramuscularly every 3 hours as a precaution against the development of meningitis, cerebritis and osteomyelitis. Should meningitis nevertheless develop, it is recommended that 10,000 units of penicillin in 10 cc. of isotonic saline be injected intraspinally once or twice daily[1,44].

Chemotherapy, Antibiotics and Sero-Therapy. Whenever pyogenic infection is actually or potentially present, penicillin and/or sulfonamide therapy should be administered. It is of course necessary to carry out the usual cutaneous or conjunctival tests for serum sensitivity.

Sedation. Stuporous and unresponsive patients require no sedation*. Restiveness should be combatted by sufficient doses to prevent the patient from injuring and exhausting himself. The following drugs, used singly or in combination and administered by mouth or rectum are strongly endorsed: phenobarbital gr. i-iii, bromides gr. xx-xl, chloral hydrate gr. xx-xxx and paraldehyde drams i-iii. Very disturbed patients require intramuscular or intravenous barbiturates, e.g., sodium amytal gr. v-xv.

It is worth bearing in mind that in the head-injured patient, a distended bladder is capable of exciting much restiveness. Catheterization offers prompt relief.

The narcotic drugs should be circumspectly avoided for the following reasons: (a) their miotic effect precludes the development of one of the most valuable of "localizing" signs, viz., a disparity in the size of the pupils; (b) they depress the activity of the respiratory and cardiovascular mechanisms, functions which may have been already embarrassed by trauma; (c) they increase intracranial tension by 50-120 mm H_2O, even in the normal individual; (d) they exert undesirable side-effects, e.g., on the gastro-intestinal functions; and (e) as sedatives they can accomplish nothing that cannot be achieved by the use of less nocuous agents.

Lumbar Puncture. In the writer's opinion, diagnostic lumbar puncture may be carried out to advantage on all freshly injured patients except those with bloody or spinal fluid discharges from the orifices. In the latter, there is a possibility of reversing the pressure-gradient and of further exposing the portal to infection. The two issues under inquiry in such examination are: (a) the determination as to whether there is blood in the spinal fluid and, if so, approximately how much; and (b) the determination of the cerebrospinal fluid pressure.

Both questions can be quickly answered with the loss of but 1-2 c.c. of fluid and the information thus obtained may give the clinician a useful attitudinal "set" for the evaluation of subsequent developments. Thus, if the spinal fluid proves to be water-clear and under normal pressure, it is extremely unlikely that cerebral laceration or contusion, and subarachnoid, subdural, intracerebral or ventricular hemorrhage are present. Under these conditions, if the patient should subsequently lose ground, the suspician that he harbors an epidural clot is justified, particularly if at a second examination the spinal fluid should be again clear but under increased

*Obvious as this may seem, the principle involved is more often violated by practitioners than it is honored.

pressure. It would then become imperative to project further clinical, roentgenographic and surgical inquiries. On the other hand, if the spinal fluid on first encounter should prove to be bloody and under normal or near-normal pressure, the inference would be reasonable that cerebral contusion, laceration and subarachnoid hemorrhage exist, and very probably also subpial and petechial hemorrhages. That the preconditions for the development of edema are already present in such a case is a safe assumption. If such a patient should lose a small amount of ground, the necessity for pressing the inquiry as to the existence of a surgically amenable lesion would be less urgent than in the first case.

The present writer is not impressed that the severity of cerebral trauma can often be expressed in terms of intracranial hypertension or that the manometry of the latter can be made a valid criterion as to the mode of therapy indicated[7,8,9,38]. Nevertheless, he is disinclined to forego the acquisition of objective data so readily obtainable and is unable to concur with those who deny the value of lumbar puncture.

To obtain reliable information, manometry must be carried out with the patient in the lateral horizontal posture. The normal pressure range is 6-12 mm Hg (80-180 mm H_2O). In the head-injured patient, the Quekenstedt test should never be carried out. It is not only incapable of yielding information as to the presence of intracranial pathology but carries with it the danger of precipitating hemorrhage.

The therapeutic (as opposed to the diagnostic) value of lumbar puncture is a matter of controversy. Some authors contend that intracranial hypertension and cerebral edema can be successfully controlled in the majority of cases by repeated spinal taps, the quantities withdrawn ranging from 30-60 c.c. up to complete emptying[23,39,40]. They consider that repeated withdrawals serve an additional purpose in that blood is gradually eliminated from the cerebrospinal fluid. Blood, when extravasated in the subarachnoid space, is presumed to act as a meningeal irritant and to interfere with the egress of the fluid into the venous system. Other workers, however, deny that such virtues attach to therapeutic taps and warn against its potential dangers[16,29,30]. They contend that the reduction of intracranial pressure may permit recently occluded vascular channels to repoen; that it may result in herniation of the temporal lobe through the tentorium cerebelli or of the cerebellar tonsils and medulla through the foramen magnum; and that it usually excites a compensatory over-production of cerebrospinal fluid such that in 2-3 hours the intracranial tension may be higher than it would otherwise have been. They acknowledge the validity of experimental evidence[16] to the effect that blood in the subarachnoid space may impede the absorption of fluid, but they find little empirical evidence to indicate that such constitutes a clinically significant factor. They further assert that hemorrhagic processes which produce increased intracranial pressure cannot as such be favorably influenced by the withdrawal of spinal fluid and that in the presence of hemorrhagic lesions, any salutory effect that follows the tap is short-lived at best. At the same time, it is argued, the patient's margin of safety is reduced, in that "non-displaceable" elements (cerebral edema and collections of blood) are enabled to take up space previously occupied by the displaceable cerebrospinal fluid. Lastly, they insist that processes other than hemorrhagic, such as cerebral edema, which appear to be favorably influenced by repeated taps are quite as susceptible to control by other measures — posture, dehydration, etc. This is not the place to inquire into the relative merits of the arguments for and against therapeutic puncture. It appears, however, that there can be little objection to its occasional use as a stopgap measure by which may be gained a few hours' delay when needed as a preliminary to surgical intervention.

Dehydration. Following the demonstration in 1921 that hypertonic saline administered intravenously is capable of reducing intracranial tension[56] it became standard clinical practice to employ dehydration measures in the treatment of head injuries. In addition and directed at the same end, the patient's daily fluid intake was commonly restricted to 600-1000 cc. per day and epsom salts* were administered by mouth. Through the years, hypertonic saline has been replaced by glucose, glucose by sucrose[35] and sorbital[33], and the sugars in turn by concentrated serum[27,53]; but the principle of dehydration in

*The use of magnesium sulphate by parenteral injection was ill-conceived from the outset and its abandonment has been urged[42].

one form or another is still ardently advocated by some workers[23,39,46]. However, a serious warning of the dangers attaching to dehydration has been sounded by several investigators[4,6,26,28,29,30] who point out that following head injury intracranial hypertension of magnitude sufficient to constitute a clinically significant factor is the exception rather than the rule; and that in those cases in which it appears to be a factor, the effect of administering hypertonic solutions is not only unpredictable but may prove frankly detrimental. It has been shown that hypertonic solutions may produce renal damage and that the side-effects of water depletion[11,12], particularly in the presence of hyperthermic or toxic states (such as those imposed by infection, delirium tremens, etc.), cannot be minimized. It is further contended that "reverse osmosis" may kill. When the finer vascular radicals of the brain have been interrupted by laceration, contusion or severe "commotion," the through passage of hypertonic solutions by which it is conceived edema may be reduced, is effectively blocked; and, what is still more serious, the hypertonic agent may spill out of the injured vessels, infiltrate the interstitial tissues and further intensify the preexisting edema.

On the whole, the principle of vigorous dehydration as applied to head injuries appears to possess little merit. The clinician may with reasonable impunity order magnesium sulphate ounces iss by mouth once or twice daily and caffeine-sodiobenzoate gr. viiss by muscle 4 to 6 times daily, but the daily fluid intake should exceed 1800-2000 cc. and in the presence of hyperthermia, delirium tremens, etc., well over 3000 cc. are required.

Nutrition. Unconscious and restive patients should not be carried for more than 24-48 hours on mere parenterally-administered fluids. If, at the end of this period, they are still unable to take nourishment by mouth, a Levine tube should be passed via the nose and hourly feedings instituted as follows:

First hours: ounces iv of glucose water

Second hour: ounces iv sweetened fruit juices

Third hour: ounces iv of eggnog

The sequence is repeated at the fourth, fifth and sixth hours, etc., throughout the entire 24 hours. Three grams of table salt should be added to the daily diet. The general superiority of the method of administering nutritive and medicinal agents by Levine tube over parenteral methods is obvious.

Mouth Hygiene. Unconscious patients, breathing for hours on end through the open mouth, are prone to develop parotitis. For this reason it is important to cleanse the mouth of dried saliva every 3-4 hours. A good solution for this purpose consists of equal parts of glycerine and lemon juice. In addition, a simple humidifier may be employed in the form of a water-moistened double layer of gauze laid across the external air passages.

Elimination. Urinary incontinence is the usual finding in stuporous and disturbed patients. It is essential, if the development of decubiti is to be averted, that linen be changed as soon as soiling occurs. If desired, an indwelling catheter may be passed into the bladder and either clamped off or led into a bottle beneath the bed. In the former case, the clamp should be released every 4-6 hours. Urinary retention is much less frequently encountered than incontinence but when present it may be managed in a similar fashion. The bladder should be periodically irrigated with a mild antisceptic solution every 4-6 hours and the catheter should be changed every few days.

During the first 2-3 days following head injury, little attention need be given the bowels. Incontinence of stool does occur but it is not nearly as frequent as urinary incontinence. When magnesium sulphate is in use, incontinence is more likely to appear. Fecal impactions are prone to develop in unconscious patients and should be sought whenever abdominal distension appears and whenever constipation is suspected.

Convulsive Seizures. Although dramatic, convulsions do not in themselves necessarily constitute a serious prognostic sign. This statement holds particularly true in regard to children and in respect to isolated as opposed to repeated seizures. Once it has gotten under way a convulsion cannot be readily aborted — nor need it be. The only procedures immediately necessary are those concerned with protecting the patient from asphyxia and self-injury. There is no necessity of prying the jaws apart in order to gag a mouth that is already clenched in spasm. Injury to the lips, tongue and teeth may result from such efforts. Repeated convulsive attacks

Fig. 6. Ventriculogram, antero-posterior view, illustrating normal size and shape of the two lateral and third ventricles.

(status epilepticus), however, demand active anticonvulsant measures in the form of bromides or dilantin-sodium by mouth, the barbiturates by vein or muscle, ether by inhalation, or avertin by rectum. Patients become rapidly exhausted from successive seizures.

It is important that the observer record accurately the march of motor events by which the onset of the witnessed convulsive attack was characterized. Such data may give a valuable clue as to the locus of the epileptogenic "firing point" in the brain and this in turn may influence surgical therapy.

The Indications for Surgery. If, as an incident to the conservative regime above outlined, the patient appears to "hold his own" or actually to improve, the regime is continued. But if he shows (a) evidence of increasing stupor, (b) persistent trends of the vital sign *away from normal* ranges or frequent fluctuations as heretofore described *within normal and near-normal* ranges, and/or (c) progressive neurologic dysfunction, he should be seriously suspected of harboring a surgically amenable lesion.

The question thus raised can be answered with *fair certainty by the placement of burr openings* over both parietal regions. Should an epidural or subdural clot be disclosed through these openings, it may be evacuated by whatever technique seems most applicable to the case in hand. Should neither of these lesions be disclosed, it is not defensible to conclude that no surgically-amenable lesion obtains. Acting in accord with the concept that a surgically-amenable lesion, if present, will betray itself by displacing or distorting the cerebral ventricles, ventriculography is now resorted to. If the ventricular shadows appear essentially normal the reasonable conclusion is that a surgical attack is not warranted (Figure 6.). In this case, the conservative measures previously employed are re-instituted. The demonstration of a ventricular shift or distortion, however, constitutes clear indication for the reflection of a bone flap and a thorough search for an epidural, subdural, intracerebral and intraventricular clot (Figure 7.). If such a lesion is encountered, it is evacuated; if none is found, the reasonable inference may be drawn that the ventricular shift or distortion must have been subtended by focal edema. In the latter case, the bone flap may be sacrificed or loosely replaced. It must be said that non-specific "decompressive" procedures of the latter type can rarely be relied upon to serve their intended role.

A practical word of caution to the surgeon is offered here: if a considerable ventricular shift has been demonstrated roentgenographically and at operation a subdural clot, too thin to account for the degree of shift, is encountered, his responsibility is not properly discharged by mere *evacuation of the subdural clot. He is obliged* in such cases to incise the cortex over one or more silent areas, thus to prove whether the shift is due in part to an intracerebral clot. *Sounding* with a ventricular needle is not an effective *method of subcortical exploration.*

Upon return of the patient to his room, conservative measures are again employed as in the period prior to operation.

Adherence to these broad general principles *requires the implicit adoption* by the clinician of a self-critical agnosticism concerning his ability to spot the trouble in any given case. The *exercise of such clinical habits and attitudinal* sets is likely to prove of greater value than reliance upon rules-of-thumb. It possesses the ad-

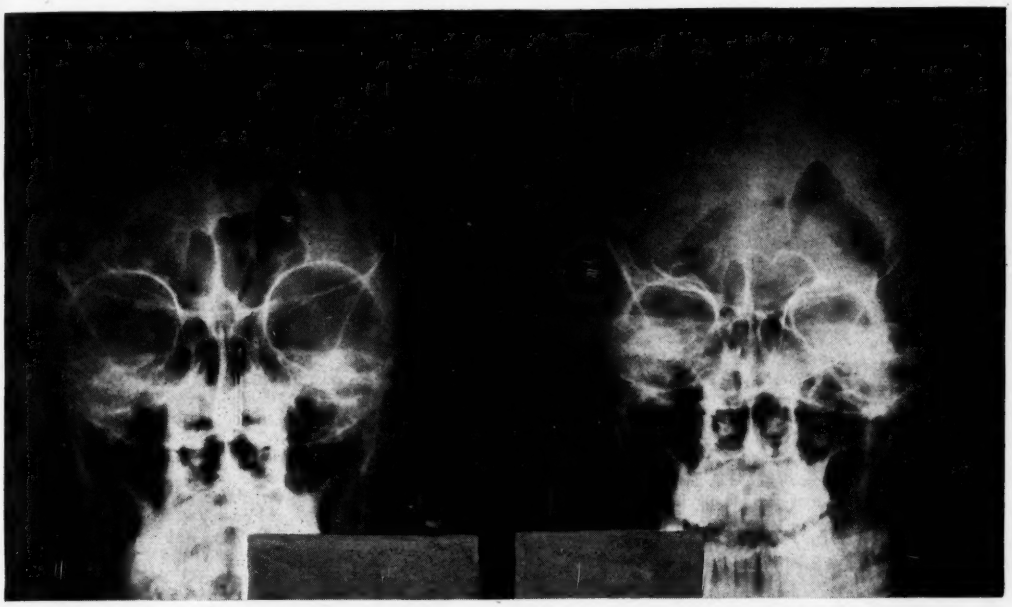

Fig. 7. Ventriculograms, antero-posterior and postero-anterior views, of patient in whom a marked shift and distortion of ventricles was produced by subdural and intracerebral clots of right hemisphere.

ditional virtues of keeping the clinician alert to the necessity of acquiring ever more information concerning the case at hand and of enabling him readily to incorporate the results of new investigations into his schemes of action.

Paradoxical as it may seem, a kind of confidence develops side by side with the practice of this brand of agnosticism — a confidence that stems from the realization that by one means or another the appropriate mode of therapy, whether conservative or surgical, can and will be made available to each patient.

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AN ANALYSIS OF HERNIAS AND INGUINAL PATHOLOGY IN YOUNG ARMY PERSONNEL

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M.C., A.U.S.

A review of hernias as contacted in a group of healthy young individuals, entering the army, reveals some very interesting information. This study was made on a group of cadets, entering the Army Air Corps, at the Nashville Classification Centre, Nashville, Tennessee.

This survey was made over a relatively short period of time contacting two hundred and twenty-two hernias from a group of seventy-two thousand, two hundred and twenty-eight applicants to the United States Army Air Forces, many of whom were perfectly aware of their disability but probably an almost equal number of whom were entirely ignorant of the presence of any inguinal pathological condition.

This analysis is made with special reference to:

(1) The incidence of hernias in healthy young American adults.
(2) The type of hernia.
(3) Complicating factors, associated with hernias.
(4) Suture materials used in our herniorrhaphies.
(5) Their postoperative care as regards physical confinement.

A much larger survey might have been carried out, but I feel it would reveal approximately the same analytical figures. There are no femoral hernias reported in this series, but two appeared for surgery a few days after termination of this study which were not included.

Hernia is a disease that has been recognized and treated ever since primitive man, although very little was understood about it at that time. It has been treated by diets, supports, massage and astringent plasters in the unstrangulated, and by ice packs, Trendelenberg position and taxis in the strangulated.

With the accumulation of greater knowledge of hernias, from the anatomical and etiological standpoint, various operative procedures were devised. It is interesting that the writings of Celsus in the first century A.D. mentioned the importance of excising the hernial sac, and closing the peritoneal opening. Galen in the second century discussed indirect inguinal hernia as a rupture through the peritoneum. His understanding of hernias was somewhat erroneous, as all his studies were made on monkeys, who have persistently patent tunica vaginali, and he assumed man's anatomy was similar. Russell and Sacks state that ten to twenty-nine per cent of males go through life with a patent funicular process. From the second to the fourteenth century, there was very little surgical advancement, as most of the hernias were treated by the priests, barbers and so-called hernialists. In the seventeenth and eighteenth centuries, there were extensive writings on the surgical approach to various types of hernias. In 1883 Bassini described his operative procedure, which he later modified, and many others have modified since. He stressed the importance of his first suture, biting through the so-called conjoined tendon, but especially the transversalis fascia, which actually forms the internal ring proper. Halstead in 1889 and Andrews in 1895 made valuable contributions. Modifications of their techniques are still in common practice, and actually very little advancement in the surgical approach of hernioplasty has been developed since.

Every operator finds himself becoming more proficient and obtaining a higher percentage of cures by a repetition of the procedure most familiar to him, and this explains why we have advocates of various techniques. Any of the commonly used operations give excellent results, provided a few simple rules are observed, namely: 1. High ligation to the sac; 2. Restoration of the floor of the inguinal canal. Hernial operations in the past have been devised, both to repair a defect in the peritoneal surface, and also to truss and support a supposedly weakened musculature in the abdominal wall. The correction of the first of these is most essential, but the second procedure arouses much argument these days. As mentioned previously, Bassini stressed the importance of his first muscular suture including the transversalis fascia along with the internal oblique and transversus, and this at the present day is considered one of the most essential steps to giving the inguinal wall its necessary strength. In some of our larger hospitals, no attempt is made to secure the internal oblique and transversus muscles to the reflection of Poupart's ligament, with a negligi-

ble recurrence rate. We have all had the opportunity to study how inadequate the approximation of the conjoined tendon to Poupart's ligament has been, holding in some areas and pulling away in others. This can probably be explained by the fact that tension sutures in muscle soon cause necrosis, allowing the muscle to separate from Poupart's, and it has been shown that a small percentage of people have tendinous fibres in the conjoined tendon. Many operators have reported excellent results with few recurrences by using living fascial grafts of fascia lata or fascial laces from the incised external oblique fascia, but we have many equally as good series eliminating the living graft.

It would seem that the natural physiology of these structures is very proficient at closing this area. The conjoined tendon acts as a protective shutter, when extensive strain is thrown on the abdominal wall, as lifting, or even when the abdominal muscles are voluntarily contracted. With the normal descent of this muscle as the protective demand is placed upon it, it is probably unnecessary to suture it to Poupart's ligament. It is reasonable to understand, however, that this area may be left unprotected when the conjoined tendon is caught off guard, on sudden movement or straining.

In this small series studied, a classical type of operation as described by Bassini was carried out on all our inguinal hernias with excellent postoperative result. This being a classification centre, our patients were rather rapidly transferred to other posts and we lost contact with them. However, by double checks, first by the surgeon, who operated on them six weeks previously, and second by the re-check department of the classification centre, eight weeks postoperatively there were no recurrences. With satisfactory results at eight weeks, I feel we have reason to assume that certainly the majority of our hernias remained cured.

A review of the incidence and type of hernias in this group of young men reveals some interesting figures. In the brief period of this study, seventy-two thousand, two hundred and twenty-eight cadets were classified, and from this group, two hundred and twenty-two hernias of all types were discovered. I think we must remember that this cannot be assumed to represent a cross-section of the percentage of hernias in all army inductees, but merely a group of cadets, with ages varying from seventeen to tweny-six years. As a college education was demanded at this time for eligibility for the air corps, this group probably was drawn from a higher social strata than average in which many anatomical defects had been previously corrected surgically.

Of these two hundred and twenty-two hernias, by far the largest percentage were inguinal, and the majority of these indirect. The following table shows the numbers and percentage numbers of each type of hernia discovered, and any associated inguinal pathology.

TABLE 1
NUMBER OF CADETS EXAMINED 72,228

	Number	Percentage
Cadets with Hernias	222	0.307
Cadets with Direct Inguinal Hernia	3	0.004
Cadets with Indirect Inguinal Hernias	180	0.249
Cadets with Hernias & Cryptorchidism	14	0.019
Cadets with Hernia and Hydroceles	6	0.008
Cadets with Incisional Hernias	12	0.016
Cadets with Umbilical Hernias	3	0.004
Cadets with Epigastric Hernias	2	0.003

In World War I, over two percent of the men were found to have inguinal hernias.

The type of hernias encountered represent most of the ordinary hernias seen in all age groups, except no intra-abdominal, sliding, or femoral types appear in this report.

There was a great preponderance of the inguinal type of hernia in our cadet series and naturally in a series of this decade, most of these were indirect. Usual statistics show eighty-two percent of abdominal hernias are inguinal. It is estimated that twenty-five percent of these eventually become bilateral. Only, a unilateral operation was performed unless a definite weakness was found on the opposite side. Right hernias were found much more frequently than left, in the ratio 4:3. The accompanying table 2 shows the locations and percentages of the indirect inguinal hernias.

TABLE 2

	Right	Left	Bilateral	Total Indirect
No.	84	64	32	180
%	46.7	35.5	17.7	

Direct hernias in this series are extremely rare, as would be expected in this age group.

only three being contacted in two hundred and twenty-two total hernias.

TABLE 3

	Right	Left	Bilateral	Total
No.	2	1	0	3
%	66.6	33.3	0	

As found in the indirect type, the incidence of direct hernia is much more prevalent on the right side than the left, although no definite conclusions can be drawn from these few cases.

Hydrocele is frequently associated with hernia, due to failure of proper closure of the processus vaginalis, and we have a large number in our surgical records. It is difficult to report on the accurate frequency and location of these according to their anatomical location, due to the diverging reports by the various surgeons. Some reported preoperatively, were found to be due to incarcerated omentum and probably could have been reduced in proper posture. True loculated hydrocele, however, whether of the cord or scrotum, was comparatively rare. Actual cases found complicating inguinal hernia were:

TABLE 4

	Right	Left	Total
No. of hernias complicated by hydrocele	2	4	6
Percentage of hernias complicated by hydrocele	0.9%	1.8%	2.7%

Hernia complicated by cryptorchidism is quite rare, especially after puberty, but conversely, practically all cryptorchidism is associated with a congenital type of hernia, or hernia into the tunica vaginalis. The related frequency of this condition varies with the decade of the individual. There is some statistical variance but in the first year of life, it has been reported to occur in as high as fourteen percent of children. However, spontaneous descent takes place in most instances and in the past few years, our literature has been flooded with favorable reports from endocrine therapy. From these reports I feel we have some evidence that we get an earlier descent of the testicle than otherwise might be expected, provided there is no mechanical obstruction. In adult life cryptorchidism has been variously estimated to occur in 0.1 to 0.2% of males.

In our operative work at this hospital, all cryptorchidism was treated: 1. because of the unfavorable results of parachute straps being pulled tightly around the thighs and groin and 2. because of the advantageous scrotal housing, with its excellent thermoregulation. In each case an attempt was made to lengthen the cord using the method described by Bevan and in some instances the testicle was anchored to the bottom of the scrotum or by modified Torek. In a few instances, where the cord was too short or the testicle showed too much atrophy, orchidectomy was performed.

The following table 5 lists our hernias, with, and without associated cryptorchidism.

TABLE 5

Indirect Inguinal Hernia with Cryptorchidism	Right	Left	Total
Number	7	7	14
% occurrence in total hernias	3.15%	3.15%	6.3%

A discussion of incisional hernia is unnecessary in a paper of this type and the occurence of such is rather infrequent, as shown in the following table 6. It is interesting to note in these healthy young cadets, that their hernias were not giving them any symptoms, many of whom did not realize that they had such an affliction, and I don't believe any of them contemplated any surgical intervention. Realizing the possibility of their developing complications with advancing years, their military examination and treatment has afforded them a great service. Statistics show eight percent of hernias are incisional.

TABLE 6

Occurrence of Incisional Hernias	Right	Left	Midline
Number (appendical)	12	0	0
% of total hernia found	5	0	0

A few umbilical and epigastric hernias were found in routine examination. None of them were large and none were causing any symptoms. They were repaired in the usual manner. See table 7 showing occurrence rate.

TABLE 7

	Umbilical	Epigastric
Number	3	2
%of Total Hernias Found	1.3%	0.9%

In all our herniorrhaphies, standard cotton suture material[1] was used throughout. Spool cotton, as described by Ginkovskey in 1936, and later by Ochsner,[2] was utilized. Number 20 crochet cotton was used for ligation and transfixation of the sac, and also interruptedly to

approximate the conjoined tendon to Poupart's ligament. Number 40 cotton interrupted sutures were used to approximate the two edges of the external oblique and likewise for Scarpa's fascia. The skin was closed with a few interrupted sutures of number 10 crochet cotton. All bleeding was controlled with No. 60 cotton ligatures. With the exception of three cases in which a continuous cotton suture was used to close the aponeurosis of the external oblique, we had no wound infections and no unusual tissue reaction to suture material. These few complications merely stress the importance of interrupting all nonabsorbable suture materials.

It is quite absurd to stress the superiority of one suture material over another, as regards end results, when you study the excellent reports on the many various suture materials used in different clinics.

However, I think it is very timely to emphasize the excellent results obtained by cotton sutures, and the minimum amount of tissue reaction to it. Meade and Long's experimental studies, revealed its tensile strength, friction coefficient, heat and moisture stability and slight tissue reaction.[3]

By the use of nonabsorbable suture material, and knowing that each suture is tied individually, I think both the patient and the surgeon have a sense of great security. All our patients were allowed to get up on the second or third postoperative day, and their moderate activity judged by their own ability and discretion. They were not permitted, however, to do any of the ward work, or take any long walks until the end of the second postoperative week. By this time the wound seemed thoroughly healed, and the patients' soreness, stiffness and weakness practically gone. They now commenced to do light ward work, and engaged in the routine physical training program of the convalescent wards. Early postoperative rising was recommended as early as 1899, but the practice was not generally accepted until about the last five years.

Several recent articles have stressed the abuse of prolonged bed rest.

In civilian life, the economic aspect of early postoperative ambulation should certainly be kept in mind, due to the great shortage of hospital accommodations and the curtailment of the patient's expenses.

The normal body functions are maintained and scarcely altered as mentioned by D'Ingianni.[4]

I feel that morbidity, skeletal and vascular complications are very greatly minimized.[5] It must be remembered that many vascular accidents still occur, but due to the muscular massaging and deep breathing, certainly the circulation is improved in the peripheral, pulmonary and hepatic circulations. Abdominal distention, the so-called "gas pains", nausea and vomiting, and urinary retention have practically disappeared with early activity.[6]

Although our series is confined to indivduals in the second and third decades, there seems to be no contra-indication to the early ambulation of older people from the standpoint of wound healing or general complications.[7]

This paper represents quite a limited series of cases, but having worked on the same service for several more months, I feel it represents a quite typical and average cross-section of the youth between the ages of eighteen years and twenty-six years, entering the army air forces.

SUMMARY

1. Author indicates the percentage of hernias and their types as found in this youthful group and the inguinal pathology associated with hernias.

2. The use of nonabsorbable suture material in the repair of hernias, with its advantages, and the absence of any disadvantages.

3. The early rehabilitation of all of these patients with excellent results and with no recurrences to our knowledge. Shortly after this series, we adopted the policy of keeping our patients in bed for two weeks postoperatively, with no better results and much increased morbidity.

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ARREST OF ACUTE HEMOLYTIC STREPTOCOCCAL ENDOCARDITIS WITH PENICILLIN THERAPY

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The prognosis of bacterial endocarditis has been changed completely by the advent of penicillin therapy and the demonstration of its usefulness in the treatment of this serious disease. Loewe, Rosenblatt, Greene and Russell[1], MacNeal, Bleven and Poindexter[2], Paullin and McLoughlin[3], and Meads, Harris and Finland[4], have reported arrest of subacute bacterial endocarditis with penicillin therapy. Anderson and Keefer[5] state that arrest of this type of endocarditis is obtained in approximately 75 per cent of the cases treated with penicillin.

However, reports of the results of penicillin therapy in acute bacterial endocarditis have been less frequent and in general less encouraging. There have been reported 48 cases of acute bacterial endocarditis treated with penicillin[1], [4], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16]. Only seven of these patients recovered: in one the disease was due to staphylococcus, in four pneumococcus, and in two hemolytic streptococcus. Of the total 48 cases 25 were caused by staphylococci, 17 by pneumococci, one by gonococci, three by hemolytic streptococci, one by Brucella abortus, and in one the organism was not given. Many of these cases were treated in the early days of penicillin therapy when adequate amounts of penicillin were not available and the results can hardly be considered failures of penicillin therapy.

In a recent report, Meads, Harris, and Finland[4], present their results in seven cases of acute endocarditis treated with more adequate amounts of penicillin. There was apparent complete recovery in three cases: two pneumococcal and one hemolytic streptococcal. Of particular interest to us is the case of streptococcal endocarditis. This occurred in a 34 year old woman with a Group A, type 28, hemolytic streptococcal endocarditis of the aortic valve. There was no response to sulfamerazine. Congestive failure developed before penicillin was started and became more severe during three days of intravenous infusion of penicillin. Treatment was then changed to intramuscular injections. On the fifth day of penicillin therapy an aortic diastolic murmur appeared. The patient improved steadily on penicillin therapy. The heart recovered compensation and she is now able to carry on her usual activities. A total of 1,455,000 units of penicillin was used over a molytic streptococcal endocarditis was treated period of 16 days. A second patient with hewithout success. However, only two injections of penicillin were given before death.

Loewe, Rosenblatt, Greene, and Russell[1], reported arrest in one patient with a hemolytic streptococcal endocarditis. They used a total of 1,400,000 units of penicillin over a period of 13 days. This patient had an old rheumatic valve lesion and was almost moribund when penicillin therapy was begun. We are reporting a third case of arrest of acute hemolytic streptococcal endocarditis treated with penicillin.

CASE REPORT

Mrs. G. L. M., a 53 year old housewife, was admitted to the hospital 14 April 1945, complaining of vomiting, pain in the left foot, both ankles and shoulders, chills, and fever.

The family history was irrelevant. She was married but separated from her husband. She had three children living and well.

She denied any previous serious illness. She admitted having recurrent joint pains for several years particularly of the shoulders but at no time were they severe or incapacitating. Seven years before she had sustained a fracture of the left ankle. She had gradually diminishing hearing in both ears for ten years.

The patient was first seen in the home of her soldier son the afternoon of hospital admission. Ten days previously she had departed by motor bus from Spokane, Washington, with her son's two-year-old child. While on the bus she became ill with what she described as a "cold". She had several vomiting attacks and noticed considerable thirst. After her arrival in Madison she remained in bed several days. Her son had been confined to his home, ill with acute tonsillitis for several days before her arrival. After three days she felt much better and was able to be up and about the home. Five days after arriving in Madison she again became ill with nausea, vomiting, chills, fever, and severe pain in the left ankle. The

From the AAF Regional Hospital, Truax Field, Madison, Wisconsin.

following day she had pain in the wrists, shoulders, and ankles.

On examination in the home the patient was obviously acutely ill. There were a few crepitant rales at the right lung base. No cardiac murmurs were noted. A tentative diagnosis of pneumonia was made and the patient was immediately hospitalized.

Physical examination on admission showed an acutely ill, white female, dehydrated, with a temperature of 104.4° F, pulse 112, and respirations 28. She was disoriented and answered questions with difficulty. The pupils reacted to light. No conjunctival petechiae were seen. The nose and throat were not remarkable. The neck was normal, no rigidity was present. The heart was not enlarged. The rhythm was regular, the tones of good quality. Over the entire precordium was a blowing systolic murmur. No diastolic murmurs were heard. The blood pressure was 100 systolic, 70 diastolic. There were a few crepitant rales over the right lower lung posteriorly. The abdomen was nontender. The liver, spleen, and kidneys were not palpable. The left foot was swollen, red, tender, and showed considerable pitting edema. There was only slight pretibial pitting bilaterally. Pain and tenderness were present in both shoulders. No petechiae were visible in the skin.

Portable x-ray examination of the chest on admission showed no pneumonic infiltration. The heart appeared normal in size and shape.

Examination of the blood on admission showed a hemoglobin of 71 per cent (photoelectric), red cell count of 4,020,000 and a white cell count of 13,000, with 89 per cent neutrophiles and 11 per cent lymphocytes. The urine was acid, specific gravity 1.018, albumen two plus, and sugar negative. The sediment showed 10 W.B.C.'s per HPF. The blood Kahn was negative.

Three hours after the admission examination the same examiner noted that the cardiac murmur was definitely louder and rougher with no change in pulse rate or the condition of the patient. The following morning her temperature was 101°. She was unable to realize that she was in a hospital or to give the correct day or month. Her story of her illness was incoherent. Examination showed no neck stiffness. Both pupils reacted to light. There was one small questionable petechiae in the right conjunctiva. Over the anterior chest were several 3 mm. sized red lesions suggesting petechiae. The blood pressure was 94/64 mm. of mercury. The heart was regular, rapid, with tones of fair quality. The left border of percussion dullness was at the mid-clavicular line in the 5th interspace. Over the whole precordium was a long, harsh, systolic murmur. At the apex and toward the left sternal border it was of grade three intensity and at the base grade two intensity. The murmur was heard in the axilla, at the left lung base posteriorly, and in the neck. No diastolic murmurs were heard. The liver and spleen were not palpable. The left foot was still red, hot, tender, and swollen. Pitting edema was present over this foot. The peripheral pulses were palpable and normal. On the left heel was a one-inch, black, firm area with some surrounding redness.

Because of the mental symptoms a lumbar puncture was done. Initial pressure was 170 mm. of water. The dynamics were normal. The fluid was clear and showed 166 W.B.C.'s with 80 per cent neutrophiles and 20 per cent lymphocytes; 110 mg. of sugar per cc.; 20.5 mg. of protein; Wasserman negative. Cultures of the fluid showed no growth.

Examination of the blood the day after admission showed a hemoglobin of 80 per cent, red cell count of 4,110,000 and a white cell count of 20,300 with 94 per cent neutrophiles and 6 per cent lymphocytes. Urine examination was unchanged except for three plus albumen. The blood non-protein nitrogen was 57 mg. per cent, blood sugar 194 mg. Electrocardiogram showed a sinus tachycardia with a rate of 130. The P-R interval was 0.16 sec. with normal axis deviation and upright T waves.

Blood cultures taken the evening of admission and the following afternoon both showed Group A, type 17 hemolytic streptococci. Throat cultures taken the day after admission also showed Group A, type 17 hemolytic streptococci. In vitro resistance tests carried out by Major F. S. Coombs showed the organism isolated from the blood to be highly resistant to sulfadiazine and moderately resistant to penicillin. Growth by Cooke's method[17] was restricted by penicillin levels up to 0.07 units per cc. Blood cultures taken on the 3rd, 9th, 17th, 38th, 83rd, and 113th hospital days showed no growth.

Because of the persistent shock with low blood pressure and dehydration, 2000 cc. of saline and 500 cc. of plasma were given intravenously. Rapid digitalization was carried out the evening of the 2nd hospital day and digitalis was continued in maintenance doses for 14 days and then omitted. At 7:00 A.M. of the 3rd hospital day the pulse was found to be grossly irregular. An electrocardiogram showed auricular fibrillation with a rate of 130. Three hours later the rate was regular and continued so throughout her stay.

On April 15, twenty-five hours after admission, penicillin was started in doses of 40,000 units every three hours intramuscularly, 320,000 units per day. It was felt that the patient had a septicemia. The changing heart murmur, petechiae, and cerebral emboli, as manifested by the delirium and spinal fluid findings, indicated that a diagnosis of acute endocarditis was probable.

The blood pressure during the second day in the hospital varied between systolic 75 to 85 and diastolic 60 to 65 mm. The pulse varied between 120 and 140 and the respirations rose to as high as 40 per minute. The temperature rose to 105.2° R at 4:00 P.M. and dropped to 99.8° R at midnight.

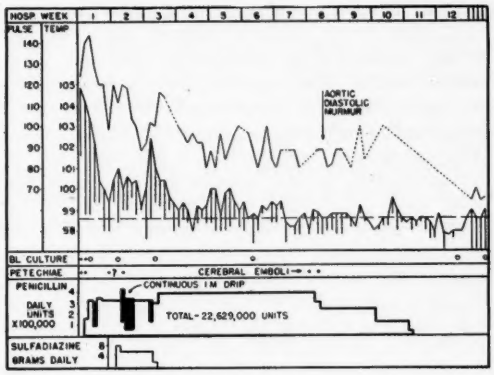
On the third hospital day she was quite alert and cheerful but continued to run a septic type of temperature to 104.6° R and pulse rate to 140. A second lumbar puncture was done which showed an initial spinal fluid pressure of 255 mm. of water. The fluid

was clear but showed 178 W. B. C. per c. mm. with 110 mg. of sugar and 20 mg. of protein. Culture of this fluid again showed no growth. The urine showed only a one plus test for albumen. The red cell count had dropped to 3,190,000 with 65 per cent hemoglobin and 10,900 leucocytes with 79 per cent neutrophiles. Blood non-protein nitrogen was 36 mg.; blood chlorides 95.5 milliequivalents per liter; total protein 8.55 gm. A transfusion of 300 cc. of citrated blood was given late in the afternoon and again the following day. The blood pressure remained at 80 to 90 systolic and 60 to 65 diastolic. A blood culture taken on the third day, after 17 hours of penicillin therapy, 240,000 units, showed no growth.

The hospital course and penicillin dosage are summarized in the graphic chart. By the fifth day there was definite improvement. On the seventh hospital day there appeared in the left groin, extending down on the buttock, clusters of red, pin head sized petechiae. A similar area was present over the left elbow. There was fluid in the left suprapatellar bursa and tenderness in both knees. On the tenth day new petechiae were noted over the chest and upper arms. The systolic murmur had become more harsh and loud. No diastolic murmurs or palpable thrills were present. Portable x-ray examination of the chest showed no abnormality in the lungs. A six foot study of the heart, patient sitting erect, showed a transverse diameter of 13.9 cm. compared with a predicted diameter of 12.6 cm. (Ungerleider and Clark). On the ninth day sulfadiazine was started in full doses and continued for nine days with no perceptible effect on the course of the disease.

Penicillin was given by constant intramuscular drip for several days but because of local reaction in the thighs and elevation of the temperature intermittent intramuscular injections were resumed. On the 17th hospital day the dose of penicillin was changed to 33,000 units every two hours, day and night.

During this whole period the patient had continued to have pains in multiple joints including the wrists, fingers, elbows, shoulders, hips and knees. The left foot slowly lost the redness and tenderness but the edema remained though diminished in amount. Surgical and orthopedic consultants failed to find evidence of purulent bone or joint infection or thrombophlebitis. X-ray examination of the left ankle and foot on the 5th and 19th hospital days failed to show any evidence of osteomyelitis or other destructive process. On the 15th hospital day there was peeling of the skin of the fingers and several days later both feet showed a similar peeling. The fingers now showed fusiform swelling and the skin had taken on a shiny appearance. There had been rapid atrophy of the small muscles of the hand with early ulnar deviation of the hand and inability to extend the fingers completely. Only slight flexion was possible. The appearance was that of a typical acute rheumatoid arthritis. During this time there was also limitation of abduction of the arms, and stiffness and pain in the knees and ankles. The calf muscles showed marked loss of substance. A moderate secondary anemia was present. Blood transfusions were



given on the 19th and on the 45th and 46th hospital days.

On the 48th hospital day a definite palpable systolic thrill was felt over the aortic area. No diastolic murmur was heard but the systolic murmur had increased in harshness and volume and was heard over the whole precordium, in the axilla, the back, and over the vessels of the neck. An electrocardiogram showed a sinus rhythm with a rate of 80, P-R interval 0.20 seconds, and moderate left axis deviation with upright T waves. Fluoroscopic examination of the heart by Captain Arnold L. Bachman on the 52nd hospital day showed the heart to be normal in size, shape, and position. The left auricle, studied with a barium filled esophagus, was within normal limits. The ascending aorta was slightly widened both to the right and left and showed moderately accentuated pulsation. The findings were indicative of a mild aneurysmal dilatation of the ascending aorta. Ill defined pulsating calcifications were seen in the cardiac shadow but because of the patient's condition they could not be carefully localized.

On the 53rd hospital day the penicillin was reduced to 240,000 units per day. The temperature had remained normal for several days with several weeks preceding of only small daily rises to 99.5° or 100°. The general improvement was marked but the swelling and tenderness of the fingers, wrists, elbows, shoulders, and knees were unchanged.

On the 50th hospital day on sitting up suddenly she became dizzy and nauseated, complained of slight pain in the back of the head, and broke out in a cold sweat. She recovered quickly. No new physical signs were found on examination and there was no rise in temperature. The blood pressure was 120/70 mm. On the 52nd hospital day while lying in bed she suddenly experienced a second attack of vertigo with double vision and a sharp occipital headache. There was no rise in temperature. The symptoms passed away within two hours and she felt well the next morning. Examination at that time showed the left biceps and triceps reflexes more active than the right. There were no changes in the reflexes of the legs and no

Babinski reflex. Examination of the heart showed a soft, short, aortic diastolic murmur along the left sternal border coming immediately after the aortic second sound. This murmur had not been present previously. With the preceding embolic episode it was interpreted as indicating the rupture of an aortic valve cusp due to the detachment of a vegetation. There was no change in the systolic murmur or systolic aortic thrill. During the next few weeks the diastolic murmur increased markedly in volume and duration and could be heard over a wider area. On the 59th hospital day an electrocardiogram showed a rate of 65, and a P-R interval of 0.24 seconds. There was left axis deviation with upright T waves. Six days later the P-R interval was 0.20 with a heart rate of 70.

On the 67th hospital day the penicillin was reduced to 120,000 units a day, and on the 74th hospital day penicillin was stopped entirely. At this time she had had a normal temperature for four weeks. The erythrocyte sedimentation rate dropped from 150 mm. per hour on the 24th hospital day to 65 mm. per hour on the 46th day. An antistreptolysin titer was 2,000 units per cc. on the 20th hospital day.

During the last month in the hospital she gained rapidly in weight and strength. Physiotherapy and the cooperation of the patient brought about marked changes in the arthritis. On the 113th hospital day she was discharged home for further convalescence. Cardiac examination still showed a grade three systolic murmur over the whole precordium with a palpable systolic thrill at the aortic area. The blowing diastolic murmur was heard best at the left sternal border, in the 4th and 5th interspaces, but was audible at the apex and base. The aortic second sound was distinctly audible. Blood pressure was 120/62 mm. Fluoroscopic examination on the day of discharge showed the heart to be normal in size, shape, and position. There was minimal rounding of the left ventricular contour. Within the cardiac shadow, in the region of the aortic valve, were seen two faintly dense irregular calcific shadows adjacent to each other pulsating synchronously with the heart beat. The ascending aorta was distinctly widened up to the region of the arch. The findings indicated calcification of the aortic valve. Laboratory examination showed a red cell count of 3,960,000 with a hemoglobin of 77 per cent. The sedimentation rate was 79 mm. per hour (Westergren). An electrocardiogram showed sinus rhythm with a rate of 65, a P-R interval of 0.22 seconds, and moderate left axis deviation with the T waves upright.

She was examined in the outpatient clinic four and one-half and again five months after the onset of her illness. There was marked improvement in the rheumatoid arthritis but she still had pains in her hips and knees and fingers. The fingers could not be completely flexed and there was still minimal swelling. The skin was soft but had lost the shiny, thin appearance. She had some limitation of motion of the hips. She denied any suggestion of dyspnea at rest or on exertion. She had walked as much as 12 blocks, up a moderate incline, with no difficulty except for her arthritis. Cardiac examination showed the same harsh, long, grade three systolic murmur over the whole precordium with a palpable systolic thrill at the aortic area. A loud, long, diastolic murmur was heard at the aortic area, along the left sternal border, and at the apex. The blood pressure was 140/69 mm. The liver and spleen were not palpable and there was no peripheral edema. The erythrocyte sedimentation rate was 41 mm. per hour (Westergren). The red cell count was 3,610,000 with a hemoglobin of 74 per cent and a leucocyte count of 6,600. The hemotocrit was 39 per cent. The urine examination was entirely normal. The antistreptolysin titer had dropped to 166 units per cc. X-ray examination of the heart showed no change from the previous examination. An electrocardiogram showed a sinus rhythm with a rate of 120. The P-R interval was 0.15 seconds and there was moderate left axis deviation with upright T waves. The patient was making plans to leave for her home in Washington the following day.

Final Diagnoses: Acute bacterial endocarditis of the aortic valve, due to Group A, type 17, hemolytic streptococci; aortic stenosis and insufficiency; rupture of aortic valve due to bacterial endocarditis; sclerosis of aortic valve; acute rheumatoid arthritis.

DISCUSSION

During the course of the illness a diagnosis of streptococcal septicemia was considered with a possible septic focus in the left foot. However, if this were so one would be forced to include a local lesion of the aortic valve because of the changing systolic murmur, the occurrence of an aortic systolic thrill, and the development of a diastolic murmur. Streptococcal septicemia can produce petechiae, but if so one would presume there would be pulmonary lesions as well, which were not present in our patient.

The finding of calcification in the aortic valve brings up consideration of its origin. Libman[18], has stated that calcification of the aortic valve may occur as part of the healing process in subacute bacterial endocarditis. Reich[19], has reported such a case in a 41 year old female. It is extremely unlikely however, that calcification could have occurred in three and one-half months from the onset of the endocarditis in our case. More probably it represents an old rheumatic lesion. Christian[20], Dry and Willius[21], and Levine[22], believe calcareous aortic stenosis is due to a preceding rheumatic infection. Karsner and Koletsky[23], found only three of 40 cases where rheumatic fever was not associated with sclerosis of the aortic valve. We have evidence

then of an old rheumatic calcific aortic valve as the site of the acute bacterial endocarditis.

The occurrance of a typical severe, acute rheumatoid arthritis in this patient brings up the relation between this disease and preceding streptococcal infection. We cannot be certain that this patient had not had arthritis before this illness. She admitted vague joint pains but denied any acute illness. The presence of a calcified aortic valve at age 53 would indicate that she had had a previous rheumatic fever. She at least had a recurrence of her arthritis. It was severe and is still active five months after the onset of her illness. Perhaps rheumatoid arthritis or rheumatic fever may become a complication in arrested cases of hemolytic streptococcal endocarditis. It is also possible that she had rheumatic fever and rheumatoid arthritis together as a result of her streptococcal infection. This possibility is suggested by the occurrence of a prolonged P-R interval late in the course of her illness. One electrocardiogram made during digitalis therapy showed a prolonged P-R interval presumed due to digitalis. Over two months after digitalis was stopped the P-R interval had shortened to 0.20 seconds. It then increased to 0.24 seconds, and one week later had shortened to 0.22 seconds. White[24], states that prolongation of the P-R interval does occur in acute bacterial endocarditis. However, at the time that statement was written only rare patients lived as long as this one and presumably he referred to the period of the acute illness. Boots and McCollom[25], describe cases with the typical joint findings of rheumatoid arthritis which they consider as chronic rheumatic fever. These patients show high antistreptolysin titers but the serum does not agglutinate hemolytic streptococci. Our patient with electrocardiographic signs of cardiac involvement and rheumatoid arthritis might fit into their group. However, the return of the antistreptolysin titer to a normal level with continued arthritic activity does not fit their criteria and is not usual in acute rheumatic fever.

This patient received a total of 22,629,000 units of penicillin over a period of 72 days. There were three reasons for such large amounts and the long period of therapy. First was the in vitro sensitivity test of the organism which showed it to be resistant to sulfadiazine in very high concentrations. The resistance tests to penicillin showed a higher degree of resistance than that of any previous hemolytic streptococcus tested in our laboratory. The tests indicated that to control the infection a blood level of 0.07 units per cc. of penicillin had to be maintained. Constant intramuscular drip administration caused local and general reactions and had to be discontinued. Intermittent administration at two hour intervals was finally used. The second reason was the occurrence of embolic phenomena as late as the 52nd hospital day. There was no febrile reaction and presumably these were sterile emboli. The possibility of septic emboli causing continuation of the infection prompted us to continue therapy until embolic episodes seemed a remote possibility. The third reason was the difficulty in determining when the original endocarditis was quiescent. With the presence of a severe rheumatoid arthritis, which was adequate explanation for a low grade fever and elevated sedimentation rate, we could not be certain it was safe to eliminate the pencillin. We feel that the penicillin might have been stopped much sooner than it was in light of the later progress. Her elevated sedimentation rate and low grade anemia at the last visit can adequately be explained by an active rheumatoid arthritis but obviously a long period of observation is necessary to be assured that a low grade bacterial endocarditis is not present. However, we feel that this is unlikely particularly with the return of the antistreptolysin titer to a level of 166 units.

Meads, Harris, and Finland[4], emphasize the importance of early diagnosis and early intensive treatment in bacterial endocarditis to prevent damage to other vital organs by emboli and to minimize the damage to the heart valves. Christian[26], stated that the earlier a correct diagnosis of bacterial endocarditis is made, the greater the probability of cure by chemotherapy. Because of the more rapid course in acute bacterial endocarditis it is even more important in this disease to start therapy as soon as possible. Meads and his associates recommend treating all cases with persistant bacteremia as though they were potential cases of endocarditis. After "arrest" or "cure" the convalescence should be carefully managed as in any other acute cardiac condition. Embolic phenomena may occur after apparent recovery and endanger vital organs or

increase the valvular damage. Severe cardiac failure may follow such episodes. Inability to control the disease in some patients has been at least partially due to intractable heart failure following destruction of a valve leaflet.

It would appear that early diagnosis and early intensive penicillin therapy offers definite hope in this otherwise hopeless disease. Emphasis must be placed on the attempts to institute treatment before severe valve damage has occured, thus minimizing the permanent cardiac sequelae.

SUMMARY

A case is reported of acute hemolytic streptococcal endocarditis where arrest of the infection was brought about with massive penicillin therapy. The patient suffered, as a complication, an acute rheumatoid arthritis which is still active five months after the onset of her illness.

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HYPERTENSION AND VERATRUM VIRIDE

A Preliminary Study

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PEORIA

The effect of Veratrum Viride in lowering blood pressure was described as early as 1874[1]; however, little was know of its parmacologic action. Haultain[2]; in 1914, investigated the drug and claimed that it lowers the blood pressure by 7 to 50 mm., slows the pulse, and increases diuresis. The classic opinion has attributed these effects to cardiac depression mainly through vagal stimulation. It was further thought that if slowing of the pulse was not obtained, then it was not beneficial.

Recently the pharmacodynamics of the drug have been re-investigated. In light of the newer knowledge of Veratrum Viride, this series of clinical observations were undertaken to determine the effect of the drug. The drug used was a biologically standardized preparation of the powdered whole plant. Previous reports in the literature have been made exclusively upon alcoholic extractions or parenteral solutions.

Veratrum Viride is not a simple product but contains a number of alkaloids. Thus the estimation of potency by direct alkloidal assay as done in the past was difficult. All this lent an atmosphere of confusion to the subject. A sur-

TABLE 1

PATIENT	SEX	AGE (YRS.)	Pb.	Pa.	Pc. max.	Daily Dose Craw Units	Length of Treatment
T.	F	49	165/110	146/82	—19/—28	15	20 weeks
A. K.	F	69	198/104	150/80	—48/—24	30	60 weeks
J. P. B.	M	53	182/118	168/98	—14/—20	15	60 weeks
M. M.	F	72	220/100	180/98	—40/—2	30	28 weeks
W. G.	F	34	158/88	120/82	—38/—6	15	20 weeks
M.	F	61	162/90	128/68	—34/—22	15	30 weeks
W. T.*	F	50	222/118	210/110	—12/—8	15	4 weeks
E. R. M.	M	33	162/102	132/84	—30/—18	15	13 weeks
J. W. D. H.	M	71	248/132	194/88	—54/—44	15	37 weeks
T.	F	67	176/100	150/88	—26/—12	15	19 weeks
R.	F	45	158/60	128/70	—30/+10	15	20 weeks
R.	F	44	180/112	180/112	—0/—0	15	11 weeks
D. E. F.	M	63	182/112	176/98	—6/—14	15	60 weeks
M. B.	F	48	220/118	188/100	—32/—8	15	37 weeks
H. G.†	M	31	180/120	180/114	—0/—6	30	4 weeks
L. S.	F	60	196/80	178/80	—18/—0	30	56 weeks
B. B.	M	62	202/122	162/108	—40/—14	30	56 weeks
Y.	F	63	175/90	140/82	—35/—12	30	52 weeks
Y.	M	66	180/90	152/80	—28/—10	30	40 weeks
S. R.	F	64	220/118	182/110	—38/—8	15	51 weeks
E. P.	M	36	165/110	150/108	—15/—2	15	41 weeks
A. T.	F	61	188/118	160/102	—28/—6	30	60 weeks
F. E. F.	F	60	180/115	180/115	—0/—0		38 weeks
A. E.	M	45	180/118	180/116	—0/—2		28 weeks
N. G.	F	50	185/100	156/80	—29/—20	15	60 weeks
C. W.	F	27	154/92	132/80	—22/—12	15	9 weeks
C. S.	M	46	204/114	178/100	—26/—14	15	8 weeks
B. C.	F	39	178/110	138/86	—40/—24	15	24 weeks
V. H.	F	46	160/94	146/82	—14/—12	15	8 weeks
B. W.	F	34	180/116	140/80	—40/—36	15	45 weeks

*Treatment discontinued
†patient died of uremia
Pb. — Pressure before Rx.
Pa. — Pressure after Rx.
Pc. — Maximum change in pressure.

vey of the standard textbooks shows a general agreement in that the blood pressure lowering effect of the drug is due to cardiac slowing. Medical opinion at the present time is being reviewed[3]. The role of vasodilatation in contributing to the fall of blood pressure has recieved attention by MacNider[4], Cramer[5], Bryant and Fleming[6]. The latter authors in using Veratrum Viride in eclampsia, believe that the principal action of the drug is vasodilatation. They conclude that its function is to obtain a generalized vasodilatation. Wilson and Smith[7], in their work on animals, found that Veratrum Viride increases the perfusion rate in isolated organs. It also caused a fall of blood pressure and an increase in size of the leg volume without perceptible change in cardiac action of anaesthetized vagotomized dogs.

This preliminary report is based on 30 cases of hypertension all of whom were treated with biologically standardized Veratrum Viride. These patients presented themselves with a myriad of complaints. Some knew they had hypertension; others were unaware of the fact. Most were found to have some evidence of renal damage, hematuria, albuminuria, hyalin, or granular casts. All had definite evidence of arteriosclerosis, from observation of the fundi, or had arteriolarnephrosclerosis. One case of malignant hypertension was observed. Three patients had suffered from coronary occlusion and one was found to have a bilateral pyelonephritis and a right hydronephrosis.

The age of the patients ranged from 27 to 72. The majority were over 50 and their combined average age was 51 years. At least three separate predrug blood pressure observations were obtained a few weeks apart, and an average was taken. The result was assumed to be the predrug level.

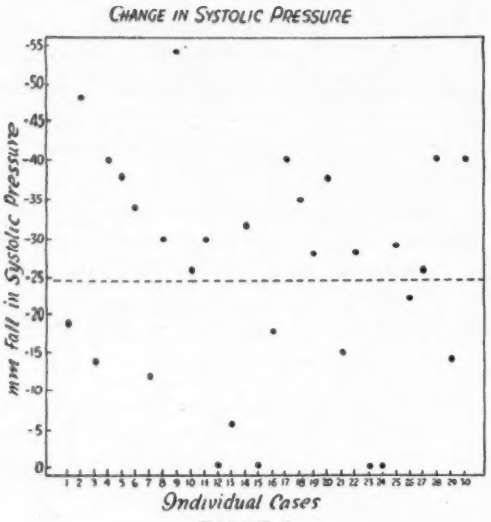

TABLE 2

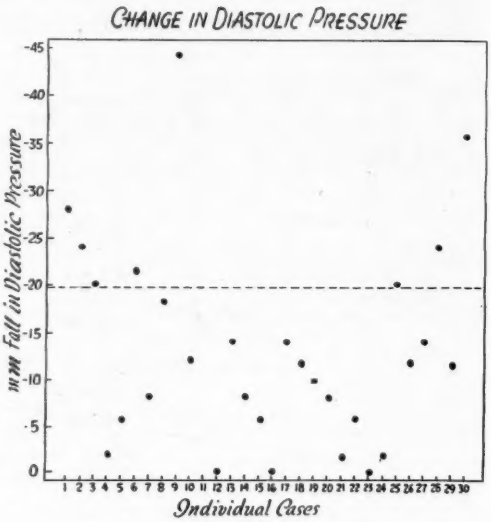

TABLE 3

Predrug blood Pressure (Average)	Systolic 185.8 + 8.9 Diastolic 107.8 + 3.0
Length of treatment	4 weeks to 60 weeks Average 33 weeks

Table 1 is a list of the clinical material with all pertinent information about the patients.

Table 2 is a scatter chart and shows the falls obtained in the systolic blood pressure of the patient. At a glance one sees that most cases are above the 25mm. level. Table 3 is another scatter chart and shows the diastolic blood pressure fall. The greatest fall of systolic pressure was 54 mm. of mercury and that of diastolic 44 mm. of mercury. The average fall was systolic 25.8 + 3.1 and diastolic 13.7 + 2.4. The percentage of patients showing a fall in systolic pressure greater than 10 mm. was 83.3% and in diastolic 56.6%.

Sixty percent of all cases showed a fall of systolic pressure greater than 25 mm. but only 26.6% showed a diastolic fall of 20 mm. of mercury.

In a recent report by Weaver et al[9], the lowering of blood pressure was studied in its relationship to the administration of the various nitrate and organic compounds. The average fall in all cases was less than that observed in this report.

	Sod. Nitrite	Manitol H 4 Nitrite	Veratrum Viride
% showing fall in systolic beyond 10 mm.	64	44	83.3
% showing fall in diastolic beyond 10 mm.	19	31	56.6

Failure with Veratrum Viride was observed in 4 cases or 13.3% of the number observed. These patients exhibited far advanced renal disease; one died with uremia and the others had severe generalized arteriosclerosis and associated arteriolarnephrosclerosis. A few patients discontinued the drug and had a subsequent rise of blood pressure which was lowered by the resumption of treatment. The dosage of the drug varied from 15 to 30 Craw units per twenty-four hours. A bout of vomiting occured in one patient and an occipital headache was observed in another. In both cases relief was obtained by withdrawing the drug and giving small doses of atropine. From this series of 30 patients, preliminary evidence indicates that Veratrum Viride in the dose required to lower blood pressure in the hypertensive patient, does not affect either the cardiac rate, respiration, or temperature. No electrocardiographic changes were observed. Dosage had to be maintained at therapeutic levels.

The results obtained in this report on the treatment of hypertension with Veratrum Viride should be critically observed and cautiously entertained. So far no cumulative effects as occur with the thiocyantes have been observed with this preparation. Nor has a tolerance of the drug been found in these patients, as one sees with the nitrites and allied compounds.

(*Continued on page* 341)

Industrial Health

Committee On Industrial Health — Jos. H. Chivers, Chm., 836 S. Michigan Ave., Chicago 5, Frank P. Hammond, H. A. Vonachen, R. I. Barickman, C. O. Sappington, Milton H. Kronenberg.

THE URGENT NEED FOR BETTER LOCAL INDUSTRIAL HEALTH ORGANIZATION

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Secretary, Council on Industrial Health
American Medical Association

The essential elements in dependable health service for industry are:

1. A competent physician who takes genuine interest in applying the principles of preventive medicine, surgery and hygiene to employed groups and who is willing to devote regular hours to such service in the working environment.
2. Industrial nurses with proper preparation, acting under the physician's immediate supervision or under standing orders developed by him or by the committee on industrial health of the county medical society.
3. Industrial hygiene service directed at improvement of working environment and control of all unhealthful exposures, to be provided physicians and others with guidance and assistance from the specialized personnel in state and local bureaus of industrial hygiene.
4. A health program which should include:
   a. Prompt and dependable first aid, emergency and subsequent medical and surgical care for all industrial disability.
   b. Health conservation of employees through physical supervision and health education.
   c. Close correlation with family physicians and other community health agencies for early and proper management of nonoccupational sickness and injury.
   d. Good records of all causes of absence from work as a guide to the establishment of preventive measures.

ORGANIZATION

The Council on Industrial Health is actively engaged in organizing committees on industrial health in the state medical societies and in all county medical societies located in areas where such a step is justified. We have recommended that the county medical society committee should contain representation from industrial practice, private practice, and the local health unit since these are the essential medical groups needed to supply the service. Obviously, the committee should understand the components of adequate service and be prepared to adjust them to existing medical and public health facilities and methods of community practice.

The committees, with local variations, will probably proceed as follows:

1. The committee in the county society should request instruction from the committee on industrial health in the state medical association and from the state division of industrial hygiene. Preferably, a preliminary conference should be held with representatives of these two agencies to establish:
   a. The lines of relationship and responsibility already existing between government, industry, labor and the medical profession.
   b. The principal industrial health problems of the community as a basis for remedial action.

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c. The proper organization and employment of local medical and health facilities.
d. Supplementary services which can be called on from sources outside the community itself.

The needs of small industry should be particularly stressed.

2. The names of all physicians now serving or willing to serve in industry should be determined. These physicians should be invited to attend a meeting at which the the results of the preliminary conference just described can be reported and general details of the program presented for discussion and adoption.
3. Conferences should be held with other essential professional groups, particularly industrial or public health nurses and industrial hygienists, in order that dependable arrangements for services provided by these groups may be made.
4. The county medical society committee should then request a conference with the executives or a representative committee of the local manufacturers' association, chamber of commerce or both to describe the program and to determine how the medical profession and the local health department can accelerate and improve production through appropriate health activity. Specifically, the following items should be discussed:
   a. The essentials of industrial health service as outlined.
   b. The health and economic benefits of such a service.
   c. Methods of supplying this service.
   d. Probable cost

   The committee of the manufacturers' association can well be asked to act permanently as advisor to the county medical society committee.
5. Active cooperation should be secured from local labor organizations both in respect to the conduct of medical services in the plant and to establish a program of health education in the community. Health education should emphasize particularly nonoccupational factors which are of importance to the health of workers — nutrition, housing, proper use of leisure time, recreation and other related activities. The committee representative of local labor organizations should be requested to assume a considerable share of responsibility for the health educational aspects of the program and should regularly act in an advisory capacity to the committee on industrial health of the medical society.
6. The next procedure should be an open meeting conducted jointly by the county medical society and the local manufacturers' association or chamber of commerce, to which employers, physicians, other professional agencies, representatives of labor and, in fact, the community at large, can be invited. This meeting will provide means for promoting the program widely throughout local industry.
7. Following preliminary organization, the activities of the county medical society's committee on industrial health will fall mainly under four major headings:
   a. Investigation of local causes of lost time in industry as a basis for necessary remedial service.
   b. Coordination of community industrial health facilities.
   c. Frequent education of the public about the benefits of an industrial health program.
   d. Continuous education of the medical profession as a means for elevating standards of industrial health service.

   In all other ways the committee should exercise that degree of initiative and leadership which will properly represent medicine's responsibilities and opportunities in this important field.

COMMENT

I should like to invite the attention of the medical profession particularly to Dr. Carl M. Peterson's article.

The greatly increased awareness of all to the need for, and value of, a healthy worker will doubtless result in a demand for medical services in industry which will challenge the medical profession. Physicians with special training and experience in industrial medicine are few in number and all will be utilized. This number must be supplemented by the private practitioner, particularly in small industries if the problem and need are successfully met. This will require collaboration of the industrial medical practitioner, the private practitioner and

the governmental agencies, such as the Division of Industrial Hygiene of your State Department of Public Health. This collaboration can best be carried out through the state and county medical societies by the development of active committees on industrial health.

Dr. Peterson has presented a sound plan as a guide for committee action. Through his plan an excellent program can be developed in county medical societies with the assistance of the state society. In this way no industry in any community need lack adequate medical services.

I should like to add that the Illinois State Department of Public Health offers its services at all times in assisting these committees.

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Illinois State Department of Health.

HYPERTENSION AND VERATRUM VIRIDE (Continued)

It is the opinion of the author at this time, that Veratrum Viride, as prepared and biologically assayed, has definite advantages over the drugs studied by Weaver et al[8]; eg., glyceroz trinitrate, sodium nitrite, erythrol tetranitrate and manitol hexanitrate in the treatment of hypertension and in our hands has demonstrated a wide margin of safety.

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PENICILLIN MAY CAUSE NERVE INJURY

Two Navy doctors suggest that penicillin may cause injury to the nerves running to the surface of the body with resultant loss of sensation and muscular power, according to the October 12 issue of *The Journal of the American Medical Association.*

Comdr. Lawrence C. Kolb, (MC), U.S.N.R., and Lieut. Comdr. Seymour J. Gray, (MC), U.S.N.R., state that they observed this muscular weakness in seven patients treated with penicillin injections into the muscles at the U. S. Naval Hospital, National Naval Medical Center, Bethesda, Md.

The nerve injury observed in all the cases occurred from 10 to 21 days after the initial injection of penicillin. The number of penicillin injections into the muscles prior to these symptoms varied from 10 to 72.

The authors point out that complete recovery from the neuritis occurred within four months in five of the seven patients.

News of the State

PERSONALS · COMING EVENTS · MARRIAGES · DEATHS

BUREAU COUNTY

Dr. Clarence Olson, Princeton, addressed the Bureau County Medical Society on November 12th, subject, "Diagnosis and Treatment of Non-Penetrating Injuries to the Pancreas."

CHAMPAIGN COUNTY

Dr. Andrew C. Ivy, vice president in charge of the Chicago Professional Colleges of the University of Illinois College of Medicine, spoke on "Medical and Surgical Aspects of Jaundice" before the Champaign County Medical Society on November 14th.

COOK COUNTY

Doctors Robert S. Berghoff and Herbert E. Schmitz addressed the Southern Illinois Medical Society at Anna in November.

Dr. Harry Olin spoke before the Emerald Avenue Presbyterian Church on November 19th, subject, "Cancer."

Dr. Robert R. Mustell took part in a round table discussion on "Socialized Medicine" at the University of Illinois College of Medicine on December 2nd.

Dr. J. H. Chivers addressed the Married People's Club, Brainerd Community Church on November 13, subject, "Socialized Medicine."

On Oct. 23, Dr. Andrew C. Ivy was guest of honor at a banquet given by former students and associates. A feature of the occasion was the proposal by Dr. Anton J. Carlson, a teacher of Dr. Ivy at the University of Chicago, to establish the Andrew C. Ivy Student Loan Fund at Northwestern University, where Dr. Ivy had been a member of the staff for twenty years until his recent appointment at the University of Illinois. Dr. Carlson contributed the first check for the creation of the fund.

Dr. H. K. Scatliff addressed the Physicians Fellowship Club Auxiliary in November, speaking on "Public Health and the Private Physician."

Dr. J. Roscoe Harry addressed the Austin Executives Club, Y.M.C.A. on December 10th. His subject was "The Business Man and His Stomach."

Dr. James H. Hutton spoke on "Safe Reducing" before the North Shore Registered Nurse Club on December 9th.

Dr. William H. Cassels presented the scientific program before the Stock Yards Branch of the Chicago Medical Society in November. He discussed "Anesthetic Emergencies."

Mr. Carl V. Moore, professor of Medicine, Washington University School of Medicine, St. Louis, and Dr. John D. Stewart, professor of surgery, University of Buffalo Medical School, addressed the Chicago Medical Society on December 11th. Dr. Moore spoke on "An Appraisal of Folic Acid for the Treatment of Anemia" and Dr. Stewart discussed "Hemoptysis."

Dr. Benjamin M. Kagan, recently released from service in the army, has been appointed director of the new Kundstadter Laboratories for Pediatric Research, Michael Reese Hospital. Dr. Kagan was from 1940 to 1942 an instructor in pediatrics at the Medical College of Virginia, Richmond, where he also engaged in private practice.

Dr. Willard O. Thompson is the new managing editor of the "Journal of Clinical Endocrinology," succeeding Dr. Kenneth W. Thompson, resigned.

The Chicago Urological Society held a meeting on October 24th at the Palmer House. The Eighteenth Annual William T. Belfield Memorial Lecture was given by Dr. Hugh J. Jewett, assistant professor of urology, Johns Hopkins University School of Medicine, Baltimore, subject, "Infiltrating Carcinoma of the Bladder: Importance of Accurate Pre-operative Classification in the Eventual Selection of Appropriate Treatment." A clinical meeting was held at the Cook County Hospital in the morning, the program was presented by the Urological Staff of Cook County Hospital.

Dr. Samuel M. Feinberg addressed the American Pharmaceutical Manufacturers' Association on the subject of "Progress in Allergy Therapy" in New York on December 9th, as part of the program of a scientific award ceremony in honor of the Mayo Foundation.

Dr. Herman L. Kretschmer gave a diagnostic clinic on "Differential Diagnosis and Treatment of Obstructions at the Neck of the Bladder" in Cleveland on October 16th, at the meeting of the Interstate Post Graduate Association of North America. During this session he was elected President-elect of the Association.

The North Side Branch of the Chicago Medical Society held a meeting on December 5th at the Drake Hotel. Dr. Stanley P. Reimann, Director Research Institute, The Lankenau Hospital, Philadelphia, spoke on "The Methyl Group and Cirrhosis of the Liver" and Dr. V. S. Counseller, Head Section on Surgery, Mayo Clinic, Rochester, discussed "The Applications of Vaginal Hysterectomy."

Information Center on Alcoholism. Plans are under way to open an information center on alcoholism in the loop by January 1 under the auspices of the newly organized Chicago Committee on Alcoholism. A survey will be made among hospitals to determine whether scientific treatment can be obtained and the center will serve as a referral agency. Later a broad research program will be undertaken, financed by contributions from private individuals and organizations. Temporary officers of the Chicago committee are Dr. Anton J. Carlson, University of Chicago, chairman; Walter O. Cromwell, Juvenile Protective Association, vice chairman and Alexander Roptchan, Council of Social Agencies, secretary-treasurer.

State-Aided Diagnostic Clinic in Evanston. The State Department of Public Health has announced the establishment of a new state-aided cancer diagnostic clinic at St. Francis Hospital, Evanston. The schedule of diagnostic meetings at this center is every Tuesday and Friday morning at 10. Owing to the high death rate from cancer and the great value of early diagnosis, the division of cancer control is making an effort to establish diagnostic clinics at convenient points throughout the state. The Evanston center makes the sixth so far established, the other five being in Chicago, Rockford, East St. Louis, Springfield and Champaign.

Available beds for Poliomyelitis. Sixteen beds for convalescent patients were made available October 16 at the University of Illinois Research and Educational hospitals.

Speech and Hearing Program. A new educational, research and clinical program in speech and hearing rehabilitation has been inaugurated by the University of Illinois College of Medicine. Herbert Koepp-Baker, Ph.D., recently released from the navy and formerly director of the Speech and Hearing Clinic at Pennsylvania State College, will serve as director and also as director of the new speech and rehabilitation division of the Illinois Eye and Ear Infirmary. In both the medical college and the infirmary the work will be supervised by Dr. Francis L. Lederer, head of the otolaryngology department and chief of that service in the eye and ear infirmary. Dr. Koepp-Baker's appointment, said to be the first of its kind in any major university, will immediately provide instruction and clinical experience in this highly specialized field for medical students, physicians and persons working in the closely correlated nonmedical branches of special education, psychology and social work. Both undergraduate and postgraduate instruction will be included in the educational program. On the postgraduate level ear, nose and throat specialists will be further trained in the correction of speech and hearing disabilities. In the nonmedical field professional speech therapists will be trained in the correction of defective hearing and speech. Clinical facilities at the university will be utilized in furthering an expanding research program.

Dr. Curtis Lee Hall, Washington, D. C., was named president-elect of the U. S. chapter of the International College of Surgeons. The organization, at its 11th annual session, voted to establish its permanent home and library at Chicago and hold its annual meeting there in 1947.

DEWITT COUNTY

Dr. Charles W. Carter, Clinton, was honored by the DeWitt County Medical Society when he was presented with a certificate and a lapel pin

in recognition of this election as a member of the Fifty Year Club of the Illinois State Medical Society. Dr. Ralph Peairs of Normal, Councilor for the Fifth District, made the presentation.

HENRY COUNTY

Dr. George F. O'Brien, Chicago, presented the scientific program before the Henry County Medical Society in November. He spoke on "Modern Treatment of Pneumonia."

KANKAKEE COUNTY

Dr. William J. Pickett, Chicago, talked on "Vascular Surgery" before the Kankakee County Medical Society on November 12th.

KNOX COUNTY

Final reports on receipts obtained in Knox County during the drive to provide funds for the American Cancer Society show a total of nearly $2,000 dollars contributed from various sources. One feature of the drive was the economy displayed by the county group which was sponsored by the Knox County Medical Society. No individual received remuneration in any form.

LA SALLE COUNTY

Drs. Robert Keeton and Andrew C. Ivy presented a scientific program before La Salle County Medical Society on December 19th.

McLEAN COUNTY

Dr. Charles N. Pease gave an illustrated talk on "Treatment of Fractures" before the McLean County Medical Society in November.

MACOUPIN COUNTY

Drs. G. C. Otrich and L. W. Roth presented a program before the Macoupin County Medical Society on November 26th discussing "The Do's and Don'ts for the General Practitioner in Eye, Ear, Nose and Throat Work."

MADISON COUNTY

Two members of the Madison County Medical Society were honored recently by a dinner and party at the Evergreen Gardens, Collinsville. They were Drs. E. C. Ferguson of Edwardsville and J. H. McIntosh of Alton. They were presented with the Fifty Year Club certificate and lapel button.

MARION COUNTY

Dr. Paul B. Rabenneck, Nashville, addressed the Centralia Woman's Club on December 2nd speaking on "Medical Fallacies."

Dr. and Mrs. Mirza P. DuComb, Patoka, observed their fiftieth wedding anniversary August 31st.

Dr. Maurice T. Horsman has resumed his medical practice in Salem, Illinois.

MORGAN COUNTY

Dr. George R. Bradley, of Jacksonville, and formerly a practicing physician in Waverly, was honored by the members of the Morgan County Medical Society, the event being in recognition of Dr. Bradley's fifty years in the practice of medicine. Dr. Andy Hall, of Mount Vernon, President of the Club, made the presentation of the certificate and lapel pin.

The Illinois State Medical Society reported a comprehensive detailed survey of the medical, dental, hospital and other health facilities for the care of children was under way in Illinois.

The survey is part of a nationwide study sponsored by the American Academy of Pediatrics to obtain dependable data on the care now available which will serve in the future planning for child health.

Members of a committee of the state society to cooperate with the academy include Dr. John F. Carey of Joliet, chairman; Dr. Gerald Cline, Bloomington; Dr. W. L. Crawford, Rockford; Dr. George L. Drennan, Jacksonville.

PEORIA COUNTY

Dr. David W. Fey is the new president of the St. Francis Hospital Staff, Peoria, it has been announced. He succeeds Dr. Paul R. Dirkse. Dr. Fey served in World War II from April 5, 1941, until the summer of 1945, retiring with the rank of lieutenant-colonel, which rank he held three years.

PIATT COUNTY

Dr. William Scott has begun the practice of medicine in Bement. He had practiced in Sullivan, Illinois, for six years before entering the navy in 1945. During his medical service, he spent 8 months overseas, most of that time in Japan.

SANGAMON COUNTY

Dr. Robert M. Goodwin, formerly of Chicago, a dermatologist, has arrived in Springfield to take over the practice of the late Dr. Willard L. Michaelson.

WHITESIDE COUNTY

Sterling Gyro club opened its 23rd crippled children's clinic November 20 at the Sterling

Public Hospital. In addition to the members of the Whiteside County Medical Society, an orthopedic specialist and a nurse were sent by the State Department of Public Health.

Dr. Walter R. Tobin, Chicago, addressed the Whiteside County Medical Society presenting "The Management of the Ambulatory Cardiac" on December 5th at the Lincoln Hotel, Sterling.

WILL-GRUNDY COUNTIES

Dr. Carmen Scuderi has closed his office at Gardner and has limited his practice to the South Wilmington office.

The following program has been arranged for the Will-Grundy County Medical Society:

Decembver 13 — Dr. Herbert E. Landes — Clinical Significance of Gross Hematuria

January 9 — Dr. Leo P. A. Sweeney — Common Eye Conditions Seen by the General Practitioner

January 23 — Dr. George A. Hellmuth — Treatment of Common Heart Conditions.

WILLIAMSON COUNTY

The Williamson County Medical Society, host to the Five County Medical Society Organization in November, had an interesting scientific program. Dr. Robert B. Rutherford, Peoria, talked on "Diabetes" and Dr. J. B. Moore, Benton, discussed "Problems of General Surgery."

MARRIAGES

NAFTULA IZBICKI to Miss Rose Malekow, both of Chicago, August 11th.

DEATHS

JEREMIAH FRANK ARMSTRONG, Chicago; University of Illinois College of Medicine, 1912. Former secretary to Booker T. Washington. Was shot and killed in his office Nov. 2nd. He was 69 years of age.

JOHN M. AXELSON, retired, Wilmette; Bennett Medical College, 1900, Northwestern University Medical School, 1904. Staff member of the West Suburban Hospital for many years; served as a captain in the Medical Corps in World War I. Died November 11th in Swedish Covenant Hospital, aged 75.

NORMAN COPELAND, Chicago; Chicago of Physicians and Surgeons, School of Medicine of the University of Illinois, 1908. Died July 21, aged 68.

FRANK S. DAVIDSON, Chicago; Rush Medical College, 1897. Formerly on the staff of Ravenswood and Alexian Brothers' Hospitals. Died Sept. 27, aged 71, of cardiovascular renal disease.

HOMER WILLARD DAVIS, Alton; Washington University School of Medicine, 1900. Chief of surgery at the Alton Memorial Hospital and surgical consultant to St. Joseph's Hospital. Died Sept. 5th, aged 72, of carcinoma of the liver.

HAROLD K. GIBSON, Chicago; Northwestern University Medical School, 1898. Had been practicing physician for 40 years and senior attending obstetrician at St. Luke's Hospital for 25 years. Died Oct. 24th, aged 70.

BYRON G. S. GRONLUND, Chicago; Hahnemann Medical College and Hospital, 1912. Had been a practicing physician in Chicago for 30 years. Died Oct. 27th in South Shore Hospital, aged 57.

ROGER W. HUBBARD, Chicago; University of Illinois College of Medicine, 1926. Had practiced in Chicago many years and was former resident of Kankakee. Died Oct. 15th of a stroke, aged 48.

IRVIN F. HUMMON, Oak Park; Chicago College of Medicine and Surgery, 1917. Died Sept. 26th, aged 72, of coronary occlusion and arteriosclerosis.

WILLIAM J. JAYNE, retired, Ingraham; Medical College of Physicians and Surgeons of Keokuk, Iowa, 1879. Had practiced medicine in Ingraham his entire life. Member of the "Fifty Year Club" for several years. Died of carcinoma of the throat June 18th at the age of 91.

JOHN A. KROPACEK, Chicago; Hahnemann Medical College 1912. Had been practicing physician and surgeon on the west side of Chicago and in Cicero for 33 years. Died at West Suburban Hospital, Sept. 29th, of injuries complicated by pneumonia. He was 58 years old.

THOMAS J. LAMPING, Chicago; Rush Medical College, 1901. Was a veteran of World War I. Had practiced medicine in Chicago many years before moving to Neenah, Wisconsin, recently. Died October 22nd in Wisconsin, aged 69.

GEORGE W. MCFATRICH, River Forest; Bennett Medical College, 1892. Founder and president of the Murine Co., Inc. Died in November, aged 76.

WILLIAM C. OCASEK, Berwyn; University of Illinois College of Medicine, 1934. Was instructor in medicine at the School and a member of the teaching staff at Illinois Research and Educational Hospital. Died of a heart ailment, Nov. 11th, aged 39.

OTTO CHARLES PINC, Chicago; Rush Medical College, 1923. Died Nov. 9th, aged 46.

JOSEPH SCHEURICH, Philo; Barnes Medical College, St. Louis, 1898. On visiting staff of Mercy Hospital and Burnham City Hospital, Champaign, where he died Sept. 7, aged 73, of coronary disease.

EDWIN M. SMITH, SR., Chicago; Northwestern University Medical School, 1886. Formerly professor of anatomy, Women's Medical College, Northwestern University Medical School. Died Oct. 30th, aged 85.

PETER STROFS, Chicago; University of Illinois College of Medicine, 1931. Instructor in surgery, University of Illinois and staff member at Hines Hospital. Died November 5th in Michael Reese Hospital, aged 43.

HASSELTINE S. WALKER, retired, Chicago; Northwestern University Woman's Medical School, 1893. Had specialized in eye, ear, nose and throat. Died Oct. 23rd, aged 76.

THOMAS F. WALSH, Chicago; Chicago Medical School, 1917. Died Sept. 14, aged 57.

THOMAS G. WALSH, Chicago; Rush Medical College, 1922. Former associate professor of Medicine at Rush. Died in St. Luke's Hospital, Nov. 4th, after suffering a heart attack on a street car. He was 51.

SYDNEY P. WAUD, Chicago; Northwestern University Medical School, 1936. Was former port surgeon of Bombay, India, for the Army Medical Corps. Was found dead in his car, Oct. 19th. He was 37 years of age.

MILLION DOLLAR GIFT FOR U. OF C. HOSPITAL

Gift of a million dollars by the Goldblatt Brothers Foundation to establish "The Nathan Goldblatt Memorial Hospital" as the center of the University of Chicago's extensive program of cancer treatment and research was announced by Ernest C. Colwell, president of the University.

As a clinical center, the hospital will be devoted exclusively to treatment of cancer and other neoplastic diseases. The hospital will be built on Ellis Avenue, just north of 59th Street, to connect with the surgical section of Billings Hospital of the University Clinics. The Nathan Goldblatt Memorial will be the only university hospital in the country with the entire staff engaged full-time in cancer treatment and research.

The hospital also will be the focus of the University of Chicago's Committee on Cancer and its associated Committee on Normal and Neoplastic Growth, which coordinate research on cancer in nine clinical and basic science departments. In addition to the present research facilities, significant additional resources will be added soon by the laboratories of the University's Institute of Radiobiology and Biophysics and its Institute of Nuclear Studies. Both institutes already have complete staffs.

These institutes, outgrowths of the work — including the world's first chain-reaction pile — done at the University on the atomic bomb during the war, will enter the promising field of cancer treatment and the research opened up by improved sources of high-energy radiations, and by the great increase in supply and forms of radioactive materials provided by the atomic "ovens."

Among the tools which the Institutes will provide are a betatron of 100 million electron volts, and a large cyclotron, which will permit radiation of tumors at greater depth and with probable greater selectivity as between normal and diseased areas.

"The gift of the Nathan Goldblatt Memorial Hospital gives great impetus to the University's work on cancer," Mr. Colwell said in announcing the gift. "The clinical facilities for cancer are a valuable asset and will be of great service to those in need of treatment. An even more important result, however, is that the hospital as a teaching and research institution will be the focus of the broad cancer research effort which is being carried on by the University in the clinical and basic sciences."

If conditions permit, construction of the hospital will begin next spring. Immediate application for approval will be made to the Civilian Production Administration. Preliminary plans call for a six-story structure, which probably will be increased to seven floors, with basement and sub-basement, providing a minimum of 800,000 cubic feet and 50,500 square feet of floor space. Dimensions of the building have been tentatively set at 164 by 44 feet.

The hospital will provide at least 50 beds in single and two-bed rooms, together with the usual service features necessary for the care of patients. There also will be two operating rooms, an out-patient clinic, offices and research laboratories for the staff, diagnostic laboratories, administrative quarters, reception rooms for patients and their relatives, and conference rooms for the staff and the scientists working under the Committee on Cancer and the Committee on Normal and Neoplastic Growth.

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